

Coal Age

A MCGRAW-HILL PUBLICATION

FEBRUARY, 1948

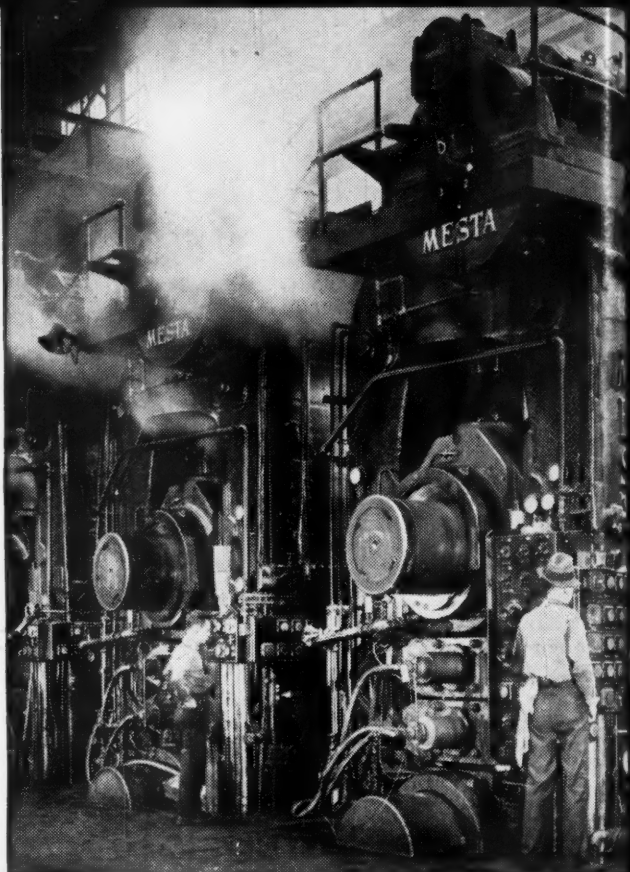


COAL IN REVIEW.....p. 74

SUNVIS "900"

OILS . . for the toughest lubrication jobs

Sunvis "900" oils are in use today in turbines, circulating systems, hydraulic systems, textile machinery and in many other types of application.



Two years ago, we introduced our Sunvis 900 Oils, Sun's premium grade for industrial use. Since then, Sunvis 900 Oils have been proving their ability to resist oxidation and sludging under the most rigorous operating conditions. They stand up for long periods of continued use at extremely high temperatures without appreciable change in physical characteristics, body, color or "neut number." Sunvis 900 Oils possess a high viscosity index and in addition have the unusually low pour-point of 0°F.

Wherever continued operations, high speeds, heavy loads and extremes of temperature combine to threaten your equipment investment . . . wherever lubrication problems are really tough—rely on Sunvis 900 Oils. There are distinct grades specially created to meet the requirements of each kind of application. All are fortified against the formation of harmful oxidation products, sludge and rust.

Sunvis 900 Oils assure you of economies through longer equipment life, continuous operations for longer periods between oil changes, less frequent "down time" for inspection and repairs.

For details write to the Industrial Advertising Department for Sunvis 900 booklet.

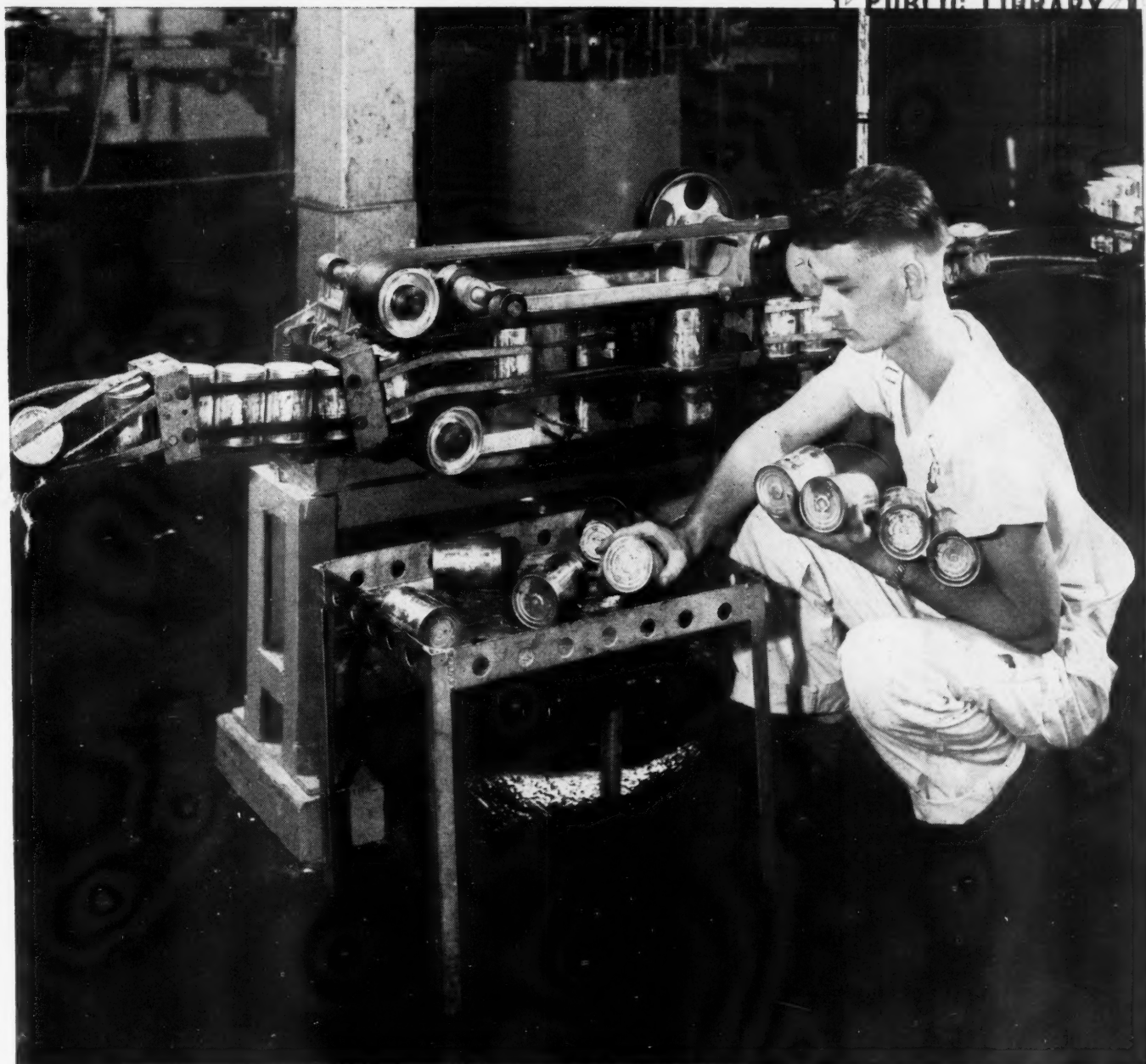


SUN OIL COMPANY

Philadelphia 3, Pa.

In Canada: Sun Oil Company, Ltd., Toronto and Montreal





The machine with electric ears

A typical example of B. F. Goodrich product development

ONCE in a long while, when tops are soldered onto evaporated milk cans, a drop of solder falls into the can and is sealed in. And once-in-a-while is too often for good canners.

So one of them developed this machine. It has a pair of moving rubber belts which seize each can between them. At one point the moving belts are jerked upward, shaking the can. If there is the smallest piece of solder inside, it "pings." An electric ear hears that ping, works an arm, and the offending can is thrown out.

But it was murder for rubber belts. They have to have enough "give" to stretch for the shaking action yet still hold the can snugly enough to move it along the line. And during the shake the belts must scuff over the can without wearing or tearing.

B. F. Goodrich had developed a belt made of strong cords each encased in thick rubber, so the cords can "give" yet quickly return to position. In addition, B. F. Goodrich had developed a means of making a belt endless, with no metal fasteners to catch or cut.

These B. F. Goodrich belts were tried on the machine and worked perfectly — they last longer, don't stretch out of shape, work more smoothly than other belts tried before.

Developments in rubber are taking place constantly at B. F. Goodrich. That's why it pays to check with your B. F. Goodrich distributor, to see what improvements BFG has made recently in the products you use. *The B. F. Goodrich Co., Industrial Products Division, Akron, Ohio.*

B. F. Goodrich
FIRST IN RUBBER

Make no mistake

FOR
INSTANCE...

Are you mistaken about Cats?



Contrary to popular belief, cats falling from a height do not always land on their feet, Eugene Berlinghoff, executive assistant of the American Society for the Prevention of Cruelty to Animals, said in reporting an increase in the number of emergency calls for many of Manhattan's cat population, estimated at "more than 100,000."

Cats are also reputed to have "nine lives"—but coal mining machinery is something else again! Its life and service depend on the use of a proper lubricant . . . and to an ever-increasing number of coal mining men, that means only HULBURT QUALITY GREASE, and has meant that for many years. Make no mistake — use Hulburt Grease plus the advisory service of Hulburt Lubrication Engineers and you'll "land on your feet" as regards longer life and greater output for your coal mining equipment.

HULBURT OIL & GREASE COMPANY—PHILADELPHIA, PENNA.

Specialists in Coal Mine Lubrication

— for Coal Mine Lubrication

use



HULBURT

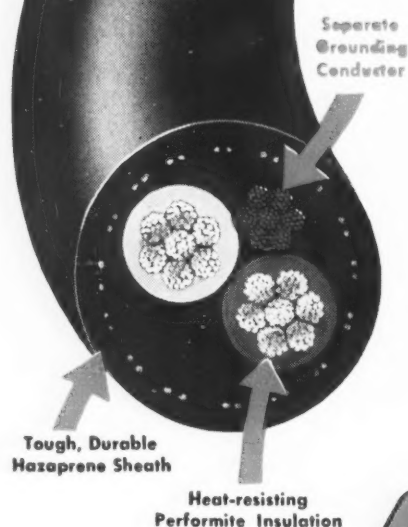
Quality **GREASE**

PROVEN BY PERFORMANCE

DOWN to EARTH SAFETY...



Hazacord Type G Mining Machine Cable with Separate Grounding Conductors



YOU can't buy a safer mining machine cable than Hazard Type G with its separate grounding conductors that assure a safe, down to earth connection at all times. In Hazard twin parallel cable construction, the grounding conductor is placed between the two power conductors; two conductor round cable has the ground wire laid in one of the interstices; in three conductor cable construction, the grounding conductor is usually split, one part in each of the three interstices.

And with Hazacord Mining Machine Cable, you get the extra safety, protection and long life provided by the well known Hazaprene jacket. Flame-resistant (Penna. Bureau of Mines Approval-104), abrasion, oil, water, and acid resistant, the Hazaprene jacket has proved itself again and again in the toughest kinds of service. What's more, Hazacord, always made with Performite heat-resisting insulation, safely carries approximately 25% more current than cable made with ordinary Performance grade insulation. Hazaprene fillers safeguard against moisture being drawn into the cable.

Have your Hazard representative show you point by point why Hazacords are your best buy from every angle. Hazard Insulated Wire Works, Division of The Okonite Company, Wilkes-Barre, Pa.

HAZARD

insulated wires and cables for every mining use

6032



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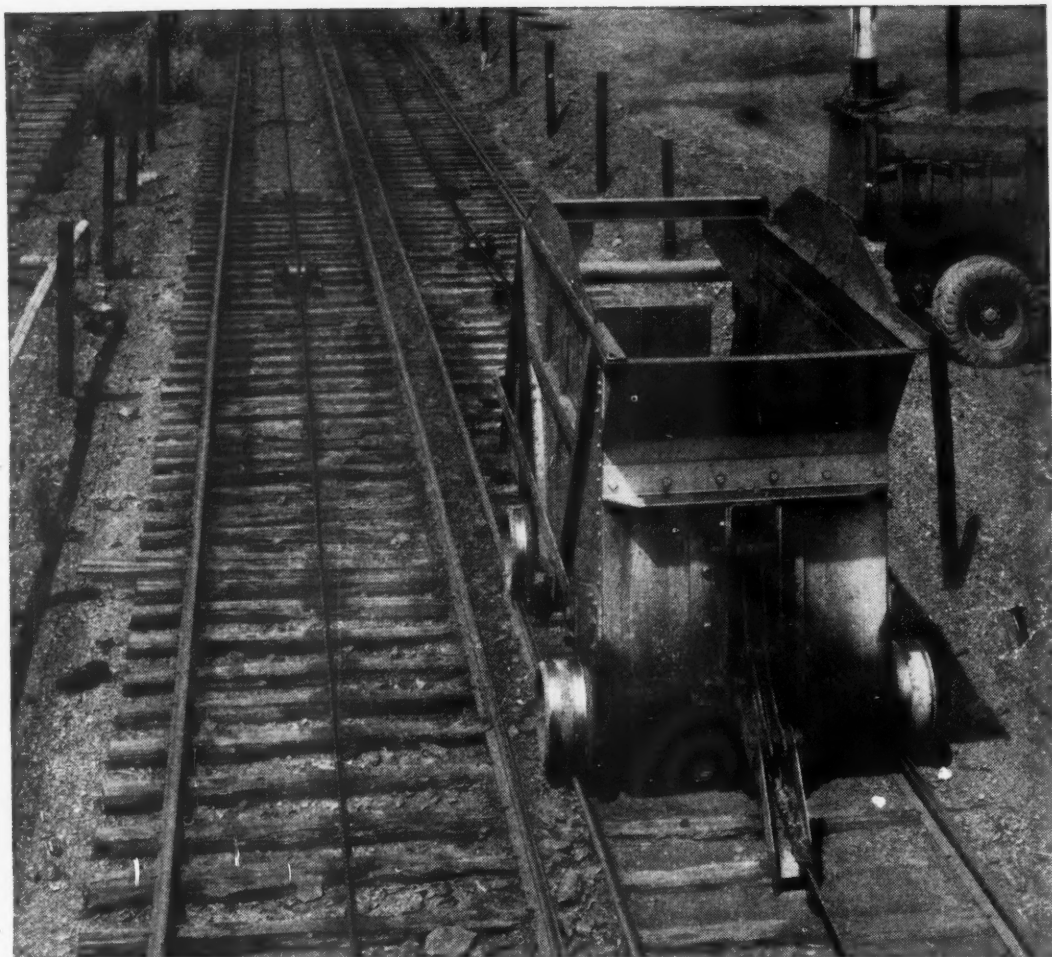
Name

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New Address

New Company Connection.....

New Title or Position.....



FREE...an Extra Pair of Eyes

When you buy new rope for incline planes, slopes, shaft hoists, and other mining equipment . . . why not be sure that every detail is right?

We can help you be sure. For instance, if you asked us to suggest a rope for the job shown here, we'd see many details that would greatly influence the choice. We'd look over the entire installation, paying particular attention to drums, sheaves, loads handled, speeds, length of haul, abrasive conditions, etc. The survey would enable us to recommend the right grade of rope and the proper size, type, lay, and core.

This Bethlehem service doesn't cost you a dime. Ask for it. Our eyes are trained to see many things that can save you trouble. By eliminating the guesswork,

you'll be certain of getting the rope that will do the best job for you.

Bethlehem makes every type of wire rope for coal and metal mining. You can depend on these ropes. You can depend on our recommendations.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by
Bethlehem Pacific Coast Steel Corporation

Export Distributor: Bethlehem Steel Export Corporation



When you think WIRE ROPE . . . think BETHLEHEM



TAKE A LEAF FROM THE PROCESS INDUSTRIES' BOOK

This BIRD Continuous Centrifugal Filter is relied upon by all the leading producers of chemicals for efficient, economical de-watering on a big scale. Handling materials considerably more abrasive than coal, it has been running continuously for years, in many cases without a single shutdown for parts replacements.

The BIRD takes the fine coal as it comes from the tables or launders without requir-

ing drag tanks or other settling devices. It discharges the coal at from 6 to 10% moisture, depending on the quantity of fines in the feed, and the water contains less than 5% solids in a closed circuited plant. The water can be returned directly to the head tank for re-use.

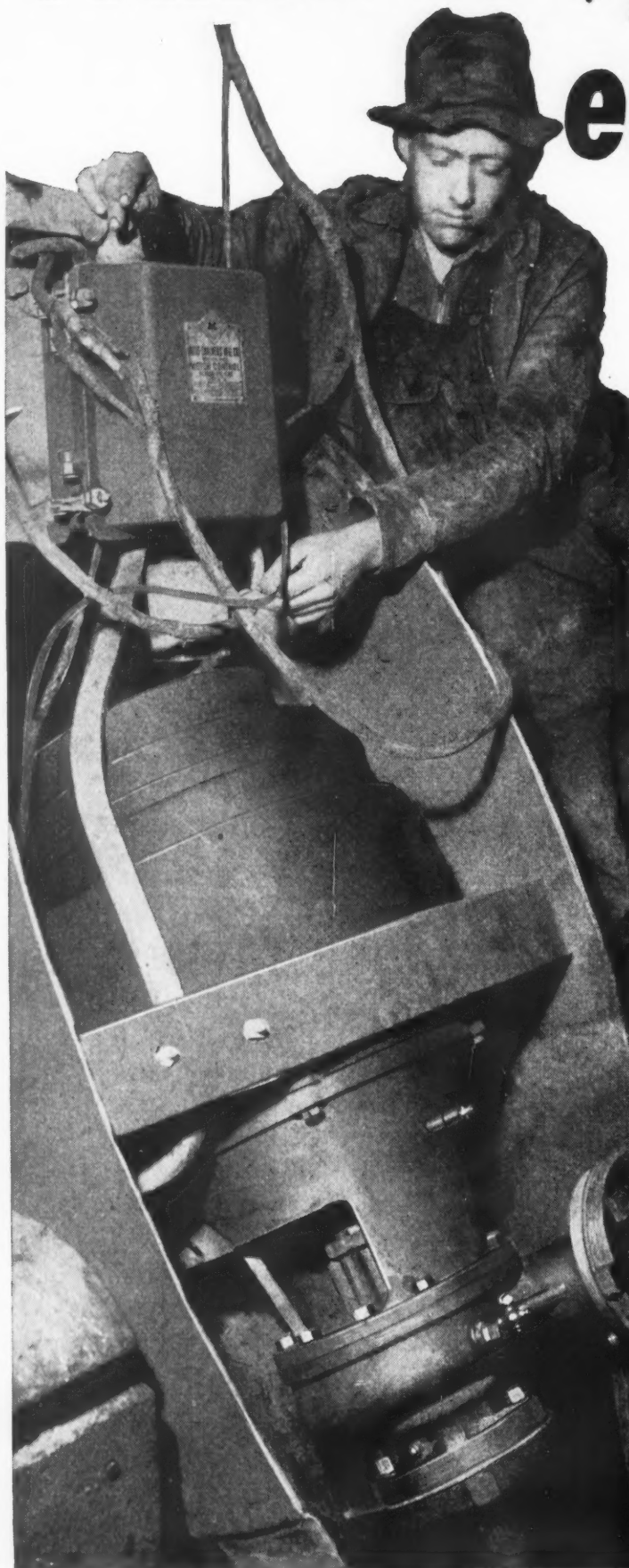
For complete information and cost estimates, write . . . *Bird Machine Company, South Walpole, Massachusetts.*

The

BIRD

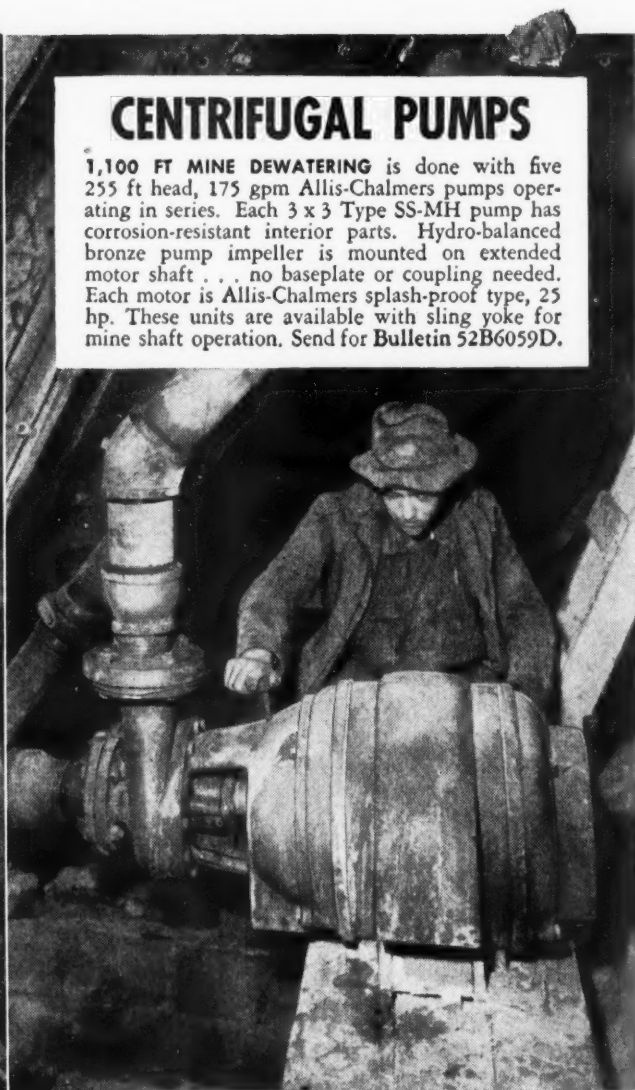
Centrifugal FILTER

Which way do you equipment



CENTRIFUGAL PUMPS

1,100 FT MINE DEWATERING is done with five 255 ft head, 175 gpm Allis-Chalmers pumps operating in series. Each 3 x 3 Type SS-MH pump has corrosion-resistant interior parts. Hydro-balanced bronze pump impeller is mounted on extended motor shaft . . . no baseplate or coupling needed. Each motor is Allis-Chalmers splash-proof type, 25 hp. These units are available with sling yoke for mine shaft operation. Send for Bulletin 52B6059D.



ALLIS-

measure costs?

- ☐ PRICE TAG or
- ☐ HOW FAST YOUR NEW EQUIPMENT PAYS OFF

WANT TO ADD PROFIT DOLLARS to your operations? Then measure inefficiency loss of your present equipment against pay-off time of new equipment for coal! Surprising *how quickly* modern, cost-cutting equipment will pay for itself in many installations.

When you specify Allis-Chalmers for coal equipment, you're dealing with an experienced *coal industry supplier*. You choose from a broad range of diversified

equipment. You get maximum type and size choice, too. That means better *suitability* for your *specific job*. And — you get equipment that's well-known for outstanding durability . . . stays on the job longer!

There's a trained equipment engineer in your locality who can help you get added profit dollars with modern equipment. He's your Allis-Chalmers representative. Call him today. ALLIS-CHALMERS, MILWAUKEE 1, WIS.

A 2396

Low-Head and Texrope are Allis-Chalmers Trademarks

PREPARATION

SAVE ON SPACE and installation costs with Low-Head vibrating screen which operates horizontally . . . requires less headroom. Available with End-Tension Deck for screening and dewatering small size coal and sludge . . . and with side tension deck for coarse screening and dewatering. Bulletin 07B6330A.

MOTORS — DRIVES

HERE'S A COMBINATION that saves power dollars in hundreds of coal installations — Allis-Chalmers motors and Texrope drives. Highest standards of craftsmanship in motor building give you added durability — premium motor quality at no extra cost! Long-life Texrope V-belt drives have belts with duplex-sealed covers that resist gritty atmospheres. Bulletins 51B6052H and 20 B6051G.



CHALMERS

— BUILDS FOR COAL PROGRESS!

The modern way to slash

-Coal-Flo Conveyor Belting

HERE'S the answer to today's soaring operating costs. It's the efficient low cost-per-ton haulage afforded by Goodyear COAL-FLO conveyor belting. The practical, money-saving advantages, listed below, have been proved by years of service in scores of coal mines. Note these 12 dollars-and-cents facts. You'll see why it pays to follow the example of so many progressive operators, and install COAL-FLO belting from face to tippie.

Why You Save with Coal-Flo

- 1** COAL-FLO conveyor haulage eliminates tracks and switches, bonding, heavy grading;

operates efficiently over pitches and rolls without jamming or mashing coal.

- 2** Cuts timbering cost 50%. The belt runs close to the rib, enabling you to use a single prop under the center of the roof load, insuring far greater safety, with much less timber.

- 3** Up to 20% more lumps in low seams, due to a greater clearance between belt and roof, plus gentler handling.

- 4** No danger of runaways with peril to "hot-footers." Haulage injuries are virtually unknown.

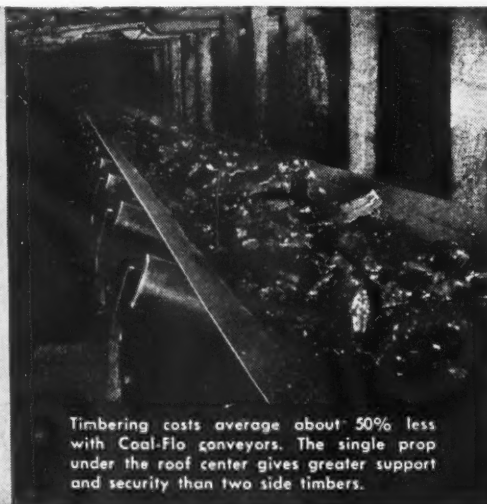
- 5** Far greater ton-per-hour capacity because haulage is continuous — there's no time

A Goodyear Belt for Every Type of Coal Haulage

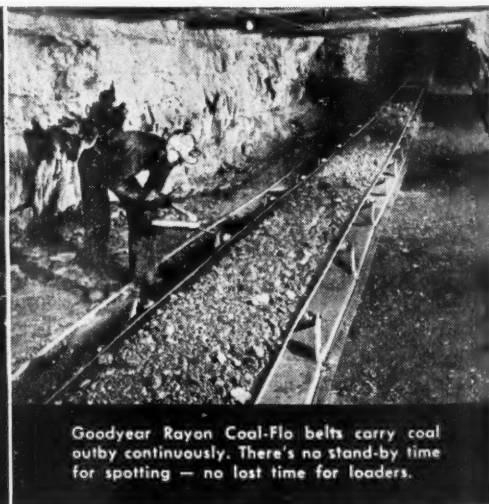
STANDARD COAL-FLO — for average distance hauls in main entries, room entries and rows.

RAYON COAL-FLO — for long distance and higher tension operations.

STEEL CABLE — for extreme long distance (up to 5-mile centers) on level entries and slope belts. Extra strength of Goodyear Steel-Cable belts makes it possible to install a single belt on slopes with lifts up to 1500 feet.



Timbering costs average about 50% less with Coal-Flo conveyors. The single prop under the roof center gives greater support and security than two side timbers.



Goodyear Rayon Coal-Flo belts carry coal outby continuously. There's no stand-by time for spotting — no lost time for loaders.



GOOD YEAR

THE GREATEST NAME IN RUBBER

Operating Costs



Goodyear Steel-Cable Slope belt carries coal in continuous flow from underground belts or surge bin to tippie.

lost for car spotting. Your cutters and loaders have no time out.

6 Greater fire and explosion safety through elimination of bare wires and charged coils, sparks and broken cables.

7 Far less brushing — you leave your gob inside even in low-seam coal because COAL-FLO belts require minimum head-room.

8 50% to 75% lower power, maintenance and operating cost.

9 Silent operation — you can hear a "working" roof.

10 Fewer roof-falls because of safer timbering and no operating vibration.

11 More uniform power demand — no surges, no peaks and valleys as occur with intermittent haulage. Better voltage regulation.

12 Continuous, uniform, automatic delivery at the tippie.

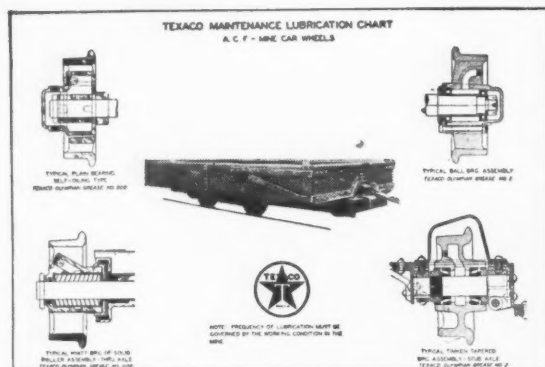
ONLY Goodyear COAL-FLO belting gives you *all* these advantages. It is the only belting that is protected against *all* forms of underground mildew.

Why not have the G.T.M. — Goodyear Technical Man — supply you with additional data on COAL-FLO conveyors and the tonnage records they've established? Write: Goodyear, Akron 16, Ohio or Los Angeles 54, California.

Don't Miss "The Way Out"

Be sure to see this historic color film that provides visual proof of every saving mentioned in this advertisement. Just call your nearest Goodyear Industrial Rubber Products Distributor. He'll arrange a showing right at your office.

Coal-Flo-T.M. The Goodyear Tire & Rubber Company



FREE — TEXACO MAINTENANCE LUBRICATION CHARTS: Leading manufacturers of underground coal mining machinery approve Texaco products for use on cutters, loaders, locomotives, etc., and have cooperated in preparing these charts. Charts show clearly where and when to use the proper Texaco lubricant. Write for the charts you need, stating make and model of each machine.

Tune in . . .
TEXACO STAR THEATRE
presents the
TONY MARTIN SHOW
every Wednesday night.
METROPOLITAN OPERA
broadcasts
every Saturday afternoon.



TEXACO LUBRICANTS

**EVEN
WHEN THE
MERCURY
IS**



**TRAINS
START EASY**

**Cold won't affect the
fine lubricating
qualities of *Texaco*
*Olympian Grease***

No matter how low the mercury may fall, your trains will start more easily and roll more smoothly when you protect car wheel bearings—plain, cavity hub or anti-friction — with *Texaco Olympian Grease*.

Texaco Olympian Grease is made in three consistencies — all easy to handle and apply. It has very high resistance to oxidation, separation and leakage, and

remains unaffected in service by moisture or extreme cold. Use it to prolong bearing life, keep cars in service longer, and to haul greater tonnage per shift.

Texaco Olympian Grease is equally effective when used in the bearings of cutters, loaders and similar equipment. It assures smoother operation, fewer repairs and replacements.

For Texaco Products and Lubrication Engineering Service, call the nearest of the more than 2500 Texaco Distributing Plants in the 48 States, or write The Texas Company, *National Sales Division*, Dept. C, 135 E. 42nd Street, New York 17, N. Y.

For the Coal Mining Industry

Because haulage speeds of 25 to 30 m.p.h. are routine over this modern haulageway, Willow Grove construction features a well-groomed roadbed and a smooth, one-level trolley wire. Top and sides are gunited to reduce falls.

OVERHEAD MAINTENANCE AT WILLOW GROVE COSTS LESS THAN *11 cents per ton-mile*



A radio telephone system provides fast, easy communication between dispatcher and the various gathering motors.

Willow Grove places O-B Section Insulators in the wire at intervals of 1500 feet. This practice affords safe, fool-proof trolley sectionalization.

Flexible guard board is used at turnouts and other locations where men must cross under the wire.

One man walks Willow Grove haulageways every day, checking the system and noting points requiring maintenance. All necessary repairs are made promptly.



Good Materials, Properly Installed and Maintained, Promote Low-Cost Haulage at Modern Hanna Mine

Trolley haulage is doing a job at Willow Grove, modern Ohio mine of the Hanna Coal Company. Powerful 21-ton locomotives speed over its eight-mile main haul, making an average of 39 round trips every 24 hours. More than 800 loaded cars are pulled over its length daily. Yet in spite of this hard service, overhead maintenance costs average less than .011 cents per ton-mile. Other costs are proportionately low.

Hanna does not skip on maintenance, either. One man walks the track daily, looking for worn spots. All necessary repairs are made

immediately. One important reason for the low costs can be traced to Hanna's policy of using only top-quality materials in the first place. These are installed carefully and properly to insure maximum performance. Regular maintenance tells the rest of the story.

The same policy can insure dependable, low-cost transportation at your mine. It is as simple as one, two, three — good materials *plus* good installation *plus* good maintenance *equals* good trolley haulage. Why not put this program into effect at your mine?

Ohio Brass

MANSFIELD, OHIO

Canadian Ohio Brass Co., Ltd., Niagara Falls, Ont.



2819-M



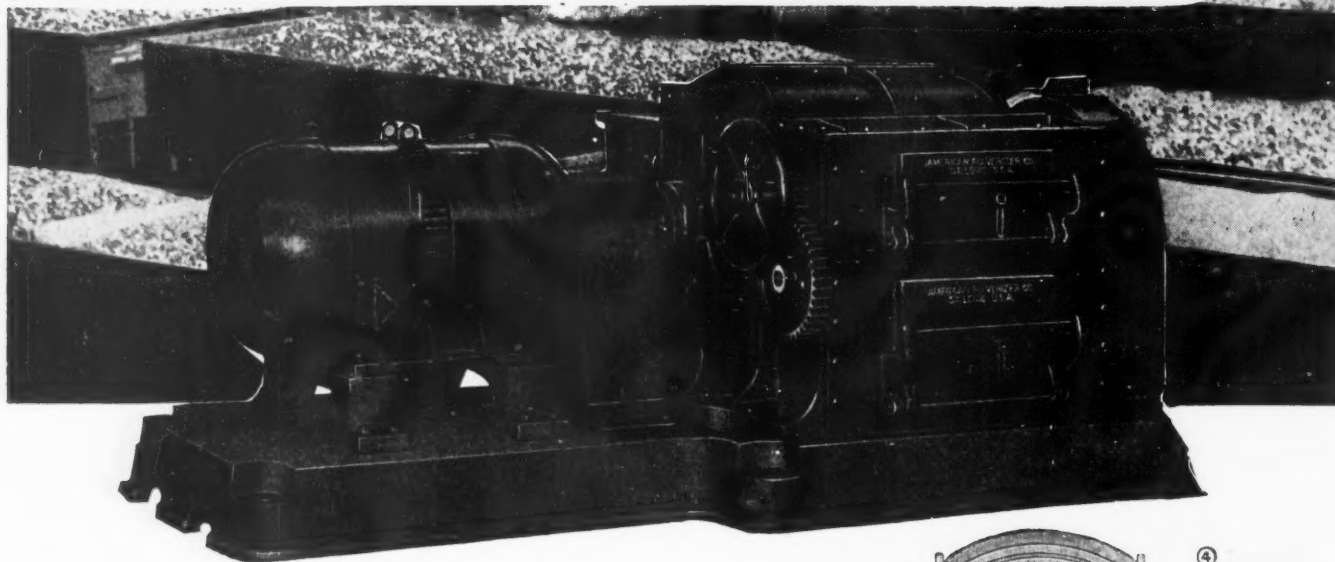
Trolley is suspended from steel timbers by O-B I-Beam Hangers and Bulldog Clamps. Because the timbers are kept at a uniform height, the trolley wire stays at one level.

An O-B Dead-End Assembly takes up the cable strain at lead-ins to O-B Safety Feeder Switches.

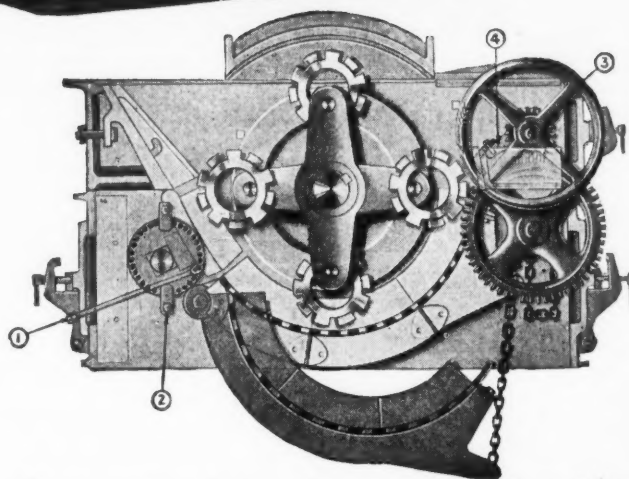


For high tonnage output of uniform, marketable sizes

AMERICAN ROLLING RING CRUSHERS



Readily marketable stoker and pulverizer sizes are profitably produced in American Rolling Ring Crushers. Through the splitting action of the patented shredder rings revolving at slower speeds, sizing is held uniform in high tonnage production with a minimum of undesirable fines. Americans are doubly adjustable for great flexibility of sizing to meet seasonable requirements and market conditions. Americans are available in a wide choice of types and sizes to exactly suit your operation...capacities from 50 to 500 TPH.



Cross sectional view shows double adjustability and the manner in which the shredder rings, revolving free on individual shafts, can deflect from tramp iron to give uninterrupted production and protect the crusher from injury. An easily cleaned metal trap catches and holds tramp iron.

Send for "AC" Bulletin on coal crushing data and crusher specifications

American

*Originators and Manufacturers of
Ring Crushers and Pulverizers*

PULVERIZER COMPANY

1119 Macklind Avenue
St. Louis 10, Mo.



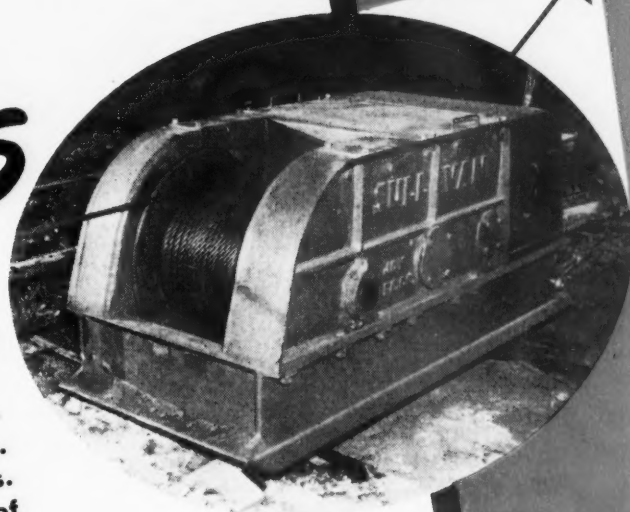
*Car Spotting handled
more Economically*

JOY

CAR PULLERS

slow speed, heavy duty pullers
that can be remotely controlled

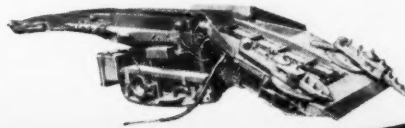
Powerful, precisely controlled pull. Low maintenance cost. All working parts are totally enclosed. Automatic motor-shaft brake holds cars on grades. Anti-back-lash brake prevents over-spinning of drum. The Joy RP rope puller (top) economically complements the car puller.



JOY LOADERS

load more tonnage more quickly

Many models to suit individual requirements, high or low seams.



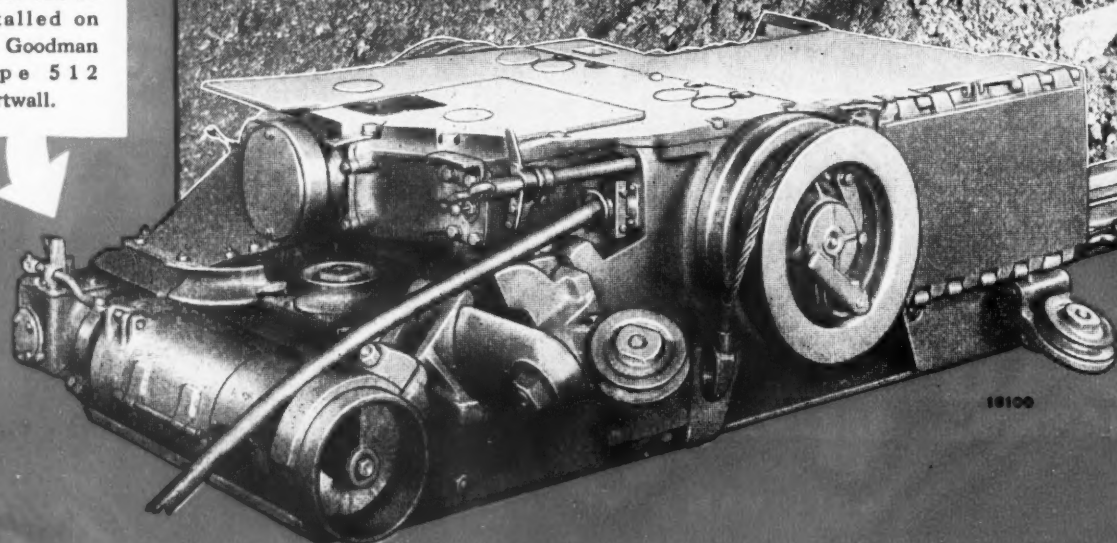
SULLIVAN DIVISION

JOY MANUFACTURING CO.

GENERAL OFFICES: HENRY W. OLIVER BLDG., PITTSBURGH, PA.

*Consult a
Joy
Engineer*

The Bug-
duster can be
installed on
any Goodman
Type 512
Shortwall.



18100



SHOVELING DAYS ARE OVER . . .

in mines where Goodman Type 512 Shortwalls equipped with Bugduster do the undercutting. Slack is swept into the Bugduster and forced out into the bottom of the row that forms to the right of the machine . . . *back from the face*. The machine helper is freed for other duties at the face, dust is eliminated, the kerf is left clean.

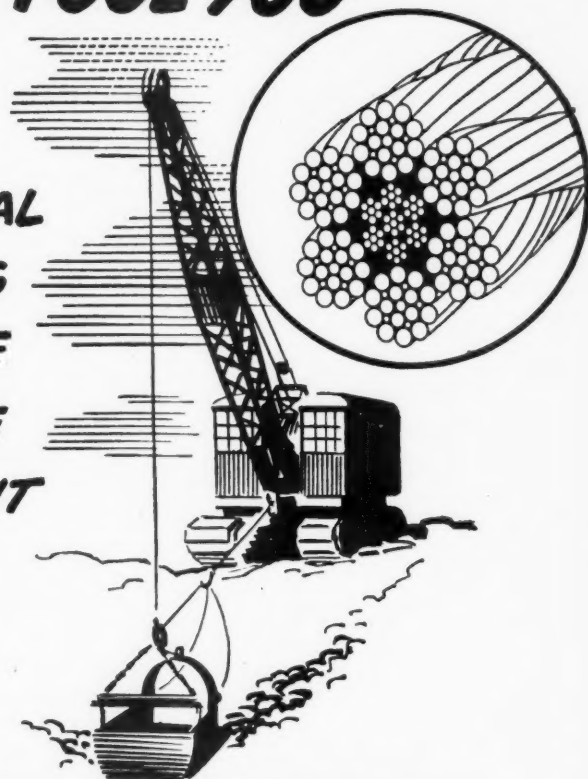
GOODMAN MANUFACTURING COMPANY

HALSTED STREET AT 48TH

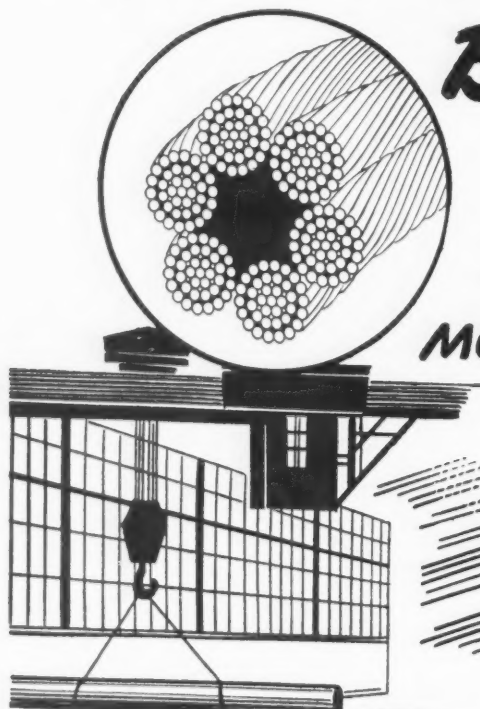
• CHICAGO 9, ILLINOIS

SOME ROPES FOOL YOU

**U-W 6x16 FILLER WIRE IS IDEAL
FOR DRAG CABLES ON DRAG
LINE EXCAVATORS BECAUSE
IT IS SUFFICIENTLY FLEXIBLE
AND ABRASION RESISTANT**



BUT...



**FOR FACTORY CRANES A
MORE FLEXIBLE ROPE IS BETTER
WE RECOMMEND U-W 6x37
CONSTRUCTION FOR
THIS PURPOSE**

**For longest and best service, always specify
U-W LAYRITE (Preformed) IMPROVED PLOW STEEL**

We invite you to let UPSON-WALTON engineer your tough rope jobs.

Copyright 1947—The Upson-Walton Company

THE UPSON-WALTON COMPANY

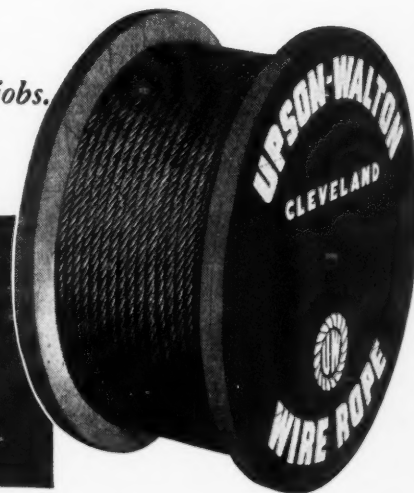
Manufacturers of Wire Rope, Wire Rope Fittings, Tackle Blocks, Brattice Cloth

Main Offices and Factory: Cleveland 13, Ohio

114 Broad Street
New York 4

737 W. Van Buren Street
Chicago 7

241 Oliver Building
Pittsburgh 22



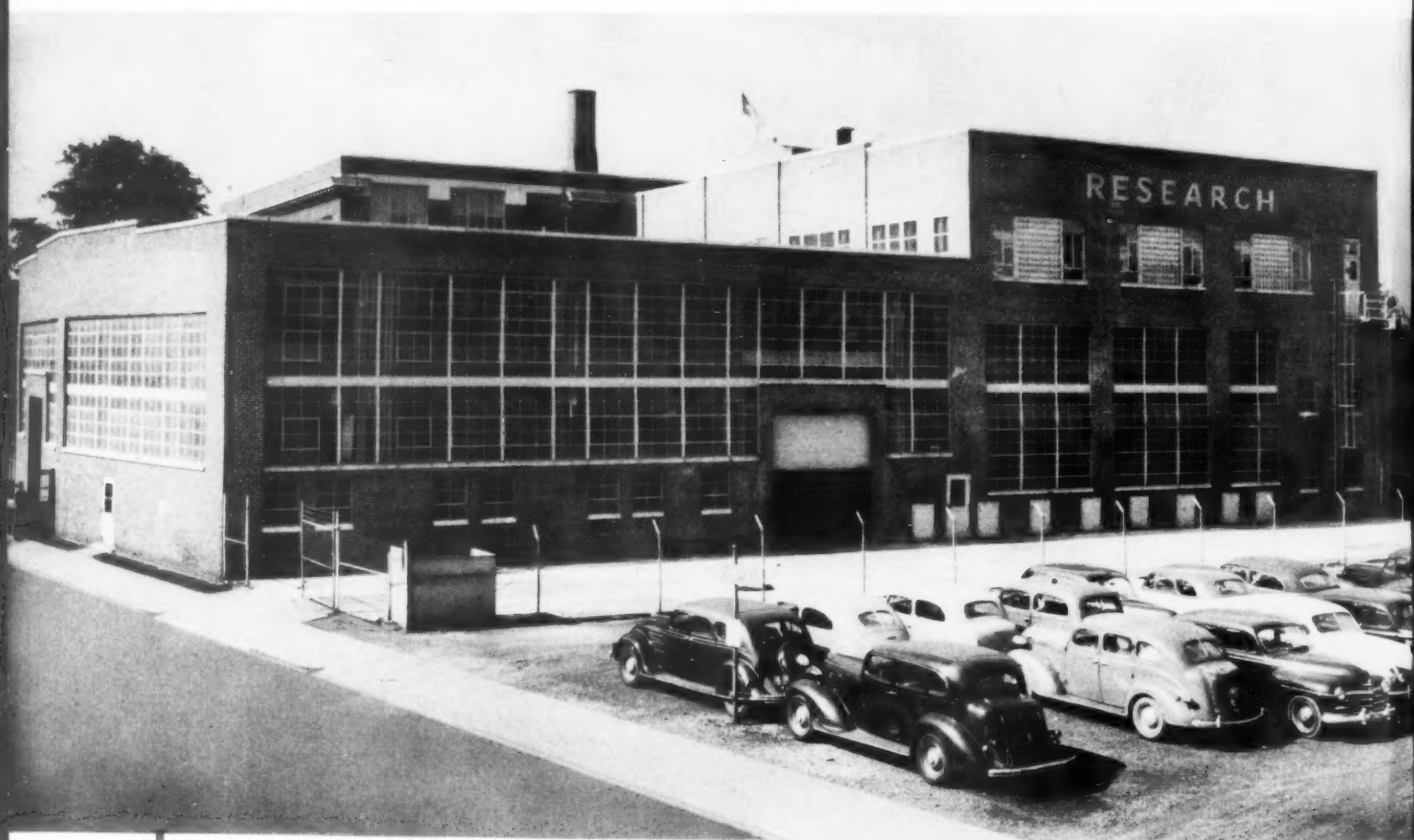
AN INVESTMENT

**IN RESEARCH
DEVELOPMENT
FOR THE FUTURE**



70 Years SERVICE TO INDUSTRY

WE PRESENT pictorially the story behind Jeffrey equipment. Since 1877, there has been a steady and persistent effort to improve Jeffrey products, making it possible for our many customers to obtain the latest in designs, materials and methods. As the photographs indicate, Jeffrey is not resting on its laurels . . . rather is continuing with new developments, vigorous laboratory experiments and the most modern facilities to make Jeffrey equipment scientifically better. We are proud of our new research center . . . equipped with the finest tools available and staffed with experienced technicians and engineers to lend their skills wherever needed . . . glad that we can make this investment for the future . . . for YOU.



NEW RESEARCH CENTER

THE JEFFREY MANUFACTURING CO.

General and Export Sales Offices
COLUMBUS 16, OHIO

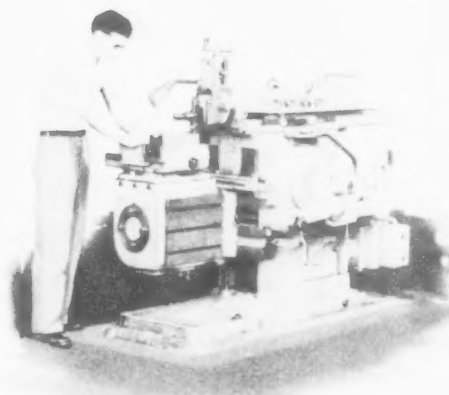
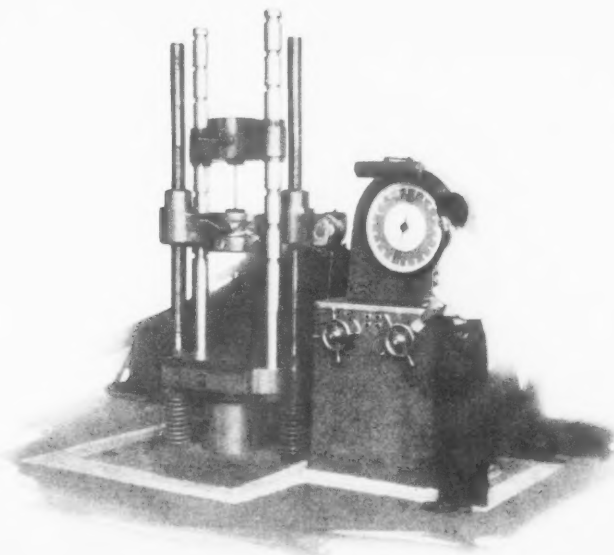
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MINING, MATERIAL HANDLING AND PROCESSING EQUIPMENT

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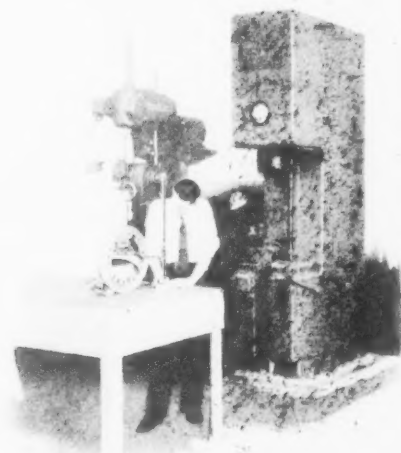
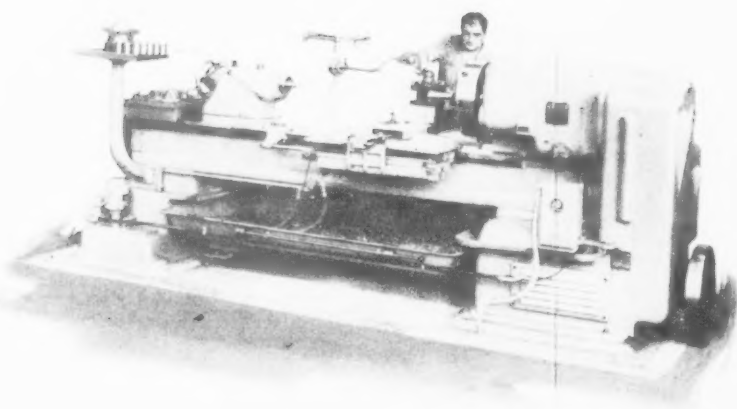
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EVERY FACILITY IN MEN AND TOOLS TO BETTER THE



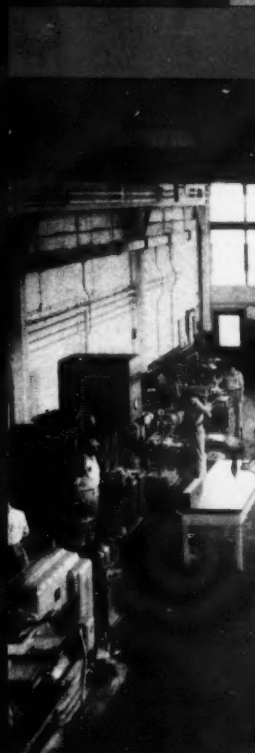
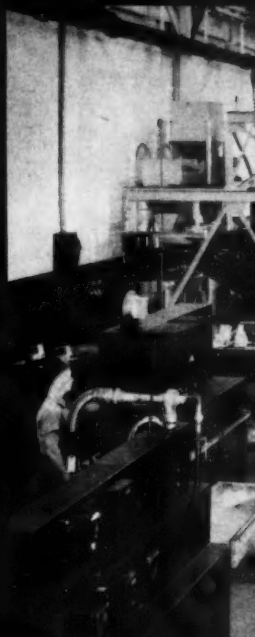
The Large workroom in Mining Research



TO BETTER THE QUALITY OF JEFFREY PRODUCTS

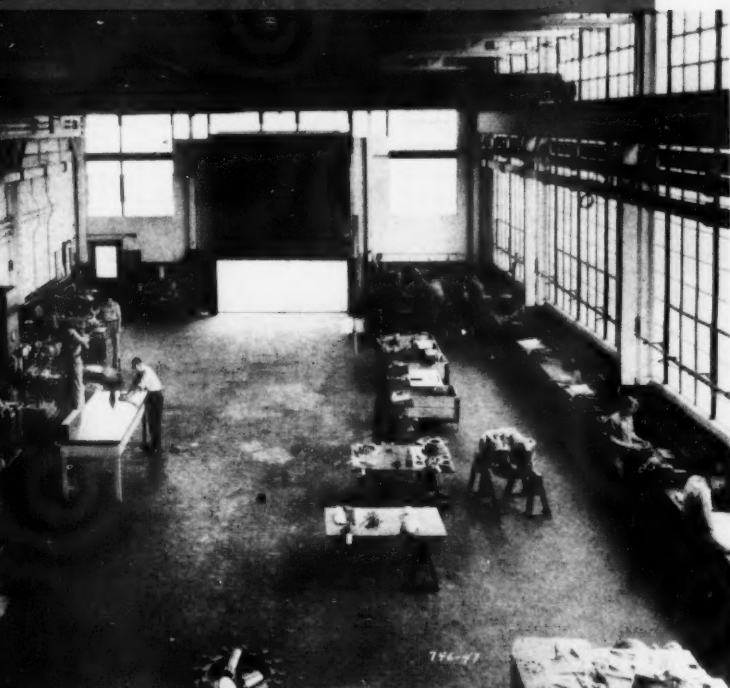


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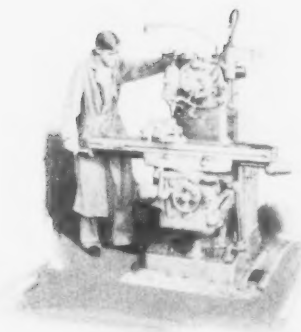




Complete facilities are available for performing tests on feeding, screening, cleaning and crushing of coal and other processing operations. All tests are of sufficient scope to insure accurate predetermination of field results . . . in advance of expenditure or installation.



Experiments on new and improved types of mining machinery are a vital part of the research program. Designs are checked and tested . . . and methods developed to facilitate manufacture on a production basis.



Chemical and Metallurgical laboratories are also an integral part of plant operations to afford a constant check on quality, strength and life of the various metals used in the manufacture of Jeffrey equipment.



JEFFREY

Complete facilities are available for performing tests on feeding, screening, cleaning and crushing of coal and other processing operations. All tests are of sufficient scope to insure accurate predetermination of field results . . . in advance of expenditure or installation.



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Experiments on new and improved types of mining machinery are a vital part of the research program. Designs are checked and tested . . . and methods developed to facilitate manufacture on a production basis.



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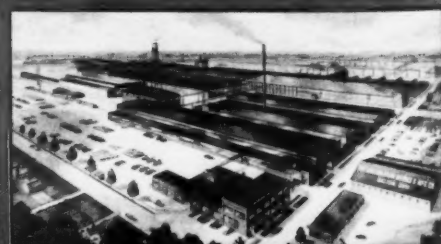
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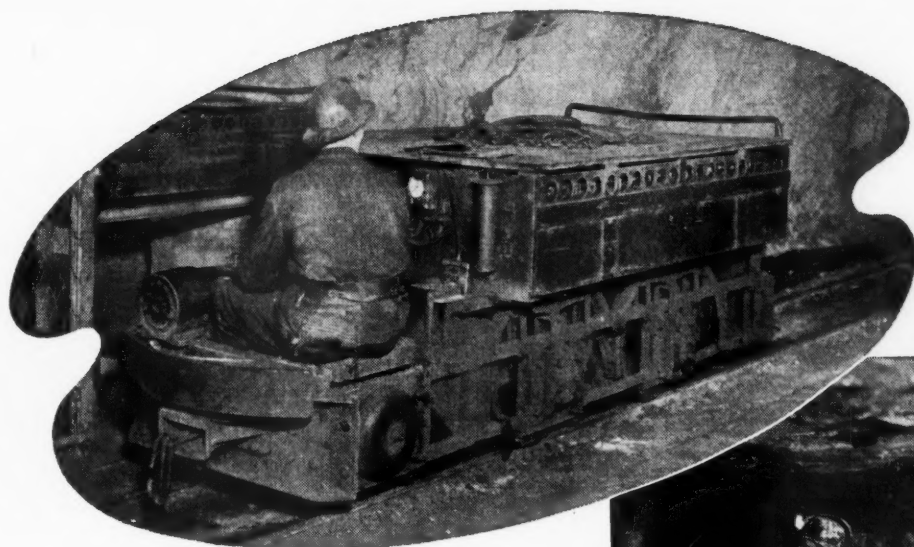


THE OHIO MALLEABLE IRON CO.
COLUMBUS, OHIO, U. S. A.



THE GALION IRON WORKS & MFG. CO.
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Chemical and Metallurgical laboratories are also an integral part of plant operations to afford a constant check on quality, strength and life of the various metals used in the manufacture of Jeffrey equipment.



Dependable Power

for Mine Locomotive or Shuttle-car ~

*In Mine Locomotives and Shuttle Cars
EDISON Nickel-Iron-Alkaline Bat-
teries Give You These Im-
portant Advantages*

- They are durable mechanically; grids, containers and other structural parts of the cells are of steel; the alkaline electrolyte is a preservative of steel.
- They are foolproof electrically; are not injured by short-circuiting, reverse charging or similar accidents; are free from self-deteriorating reactions.
- They can be charged rapidly; do not require critical adjustment of charge rates; can be charged directly from mine d-c supply.
- They withstand temperature extremes; are free from freezing hazard; are easily ventilated for rapid cooling.
- They can stand idle indefinitely without injury, without attention, and without expense.
- They are simple and easy to maintain.

WHEN IT COMES to standing up in mine haulage service—on locomotives or shuttle cars—EDISON Nickel-Iron-Alkaline Batteries have no equal for rugged strength and dependability. As a result, they give the closest approach to failure-free, uninterrupted haulage power it is possible to obtain, and give longer service life than other types of batteries. The reasons are few and simple: steel cell construction that withstands rough, hard usage; an alkaline electrolyte that is a preservative of steel; and an electrochemical principle of operation that is free from self-destructive reactions. Because they stay on the job and out of the repair shop, nickel-iron-alkaline batteries help cut haulage costs. *Edison Storage Battery Division of Thomas A. Edison, Incorporated, West Orange, N. J. In Canada: International Equipment Company, Ltd., Montreal and Toronto.*



EDISON
Nickel • Iron • Alkaline
STORAGE BATTERIES

**DRAG IT
OVER
ROCKS**



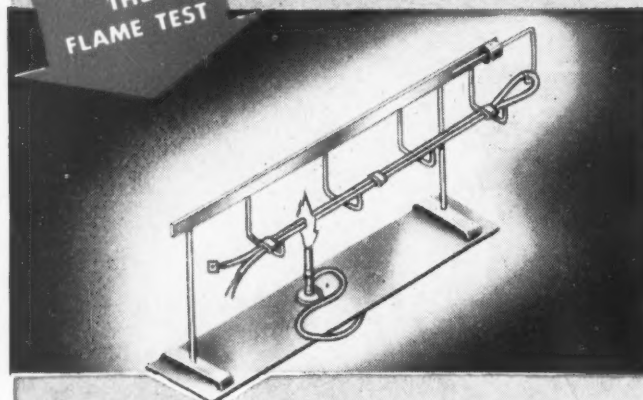
Its Neoprene "rubber armor" is as tough as truck tires . . . will stand years of scuffing and scraping. Type PS Shielding with conducting rubber tape plus ground wires assures utmost safety and maximum electrical endurance.

**SOAK IT
IN ACID
MINE WATER**



Synthetic Neoprene was engineered to resist corrosive acids, alkalis, oil and grease . . . and especially the destructive conditions found in most mines.

**GIVE IT
THE
FLAME TEST**

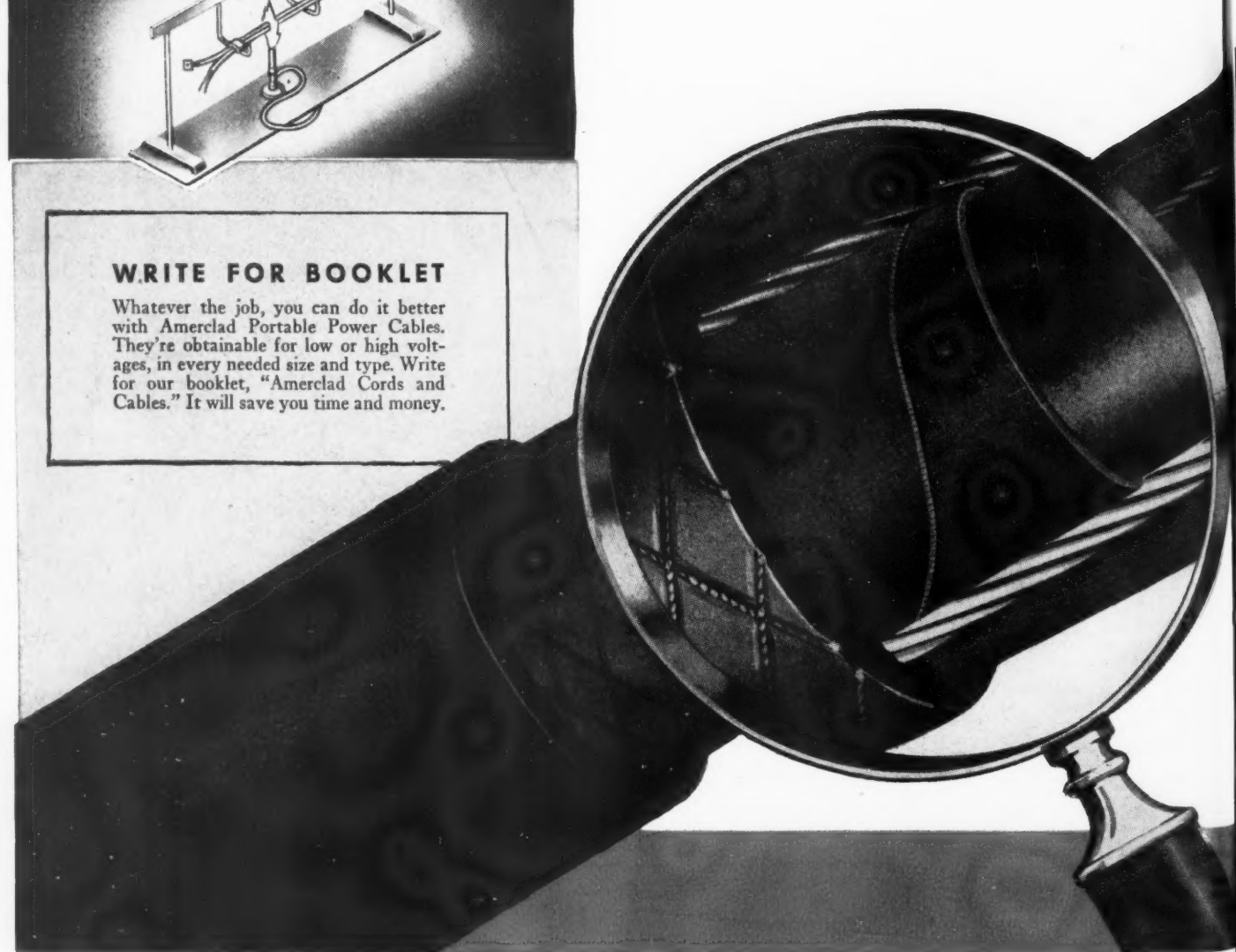


U-S-S Amerclad is approved by the State of Pennsylvania under the new flame resisting regulations.

WRITE FOR BOOKLET

Whatever the job, you can do it better with Amerclad Portable Power Cables. They're obtainable for low or high voltages, in every needed size and type. Write for our booklet, "Amerclad Cords and Cables." It will save you time and money.

If your cable



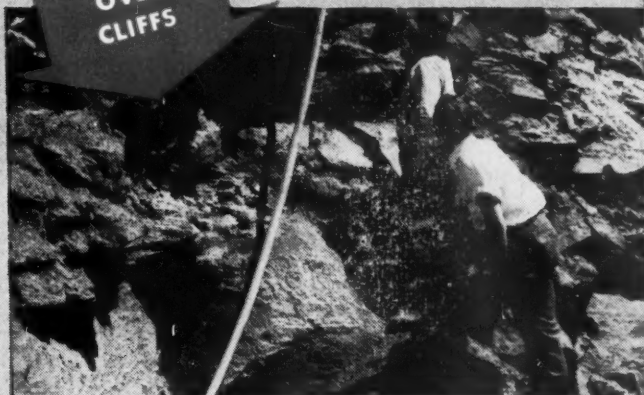
**RUN OVER
IT WITH
HEAVY
EQUIPMENT**

Accidents do happen and this tough, resilient cable is engineered to stand the rugged service of strip mining or any other outside construction work.



**HANG IT
OVER
CLIFFS**

The high-strength steel strands which serve as ground wires also furnish the extra strength needed for supporting the weight of the cable when it is hanging over cliffs or suspended over streams and road crossings.



must take punishment like this . . .

AMERCLAD GPS

IS THE CABLE YOU NEED

How PS Shielding improves worker safety

PS Shielding with conducting rubber tape is a development originated by American Steel & Wire Company engineers. It has been so successful in improving the safety of electrical cables that many other cable makers have been licensed to use this type of construction.

Type GPS Shovel Cables are made up of three flexible conductors separately insulated and separately covered with *conducting* fabric tape. When the three conductors are cabled together, three bare ground wires are laid up, one in each interstice of the insulated conductors. The assembly is completed with rubber fillers, seine cord and a heavy Neoprene jacket.

Short circuit tests were made by driving spikes and metal objects through the conducting tape into the conductor without touching the ground wire. These faults invariably tripped the overload breaker showing that PS Shielding is truly an effective safety measure.

The conclusion is that you can use these cheaper, lighter, and smaller GPS Shielded Cables without sacrifice of the safety features of the full metallic shielded Type SH Amerclad Shovel Cables.



AMERICAN STEEL & WIRE COMPANY

Cleveland, Chicago and New York

Columbia Steel Company, San Francisco, *Pacific Coast Distributors*
Tennessee Coal, Iron & Railroad Company, Birmingham, *Southern Distributors*
United States Steel Export Company, New York

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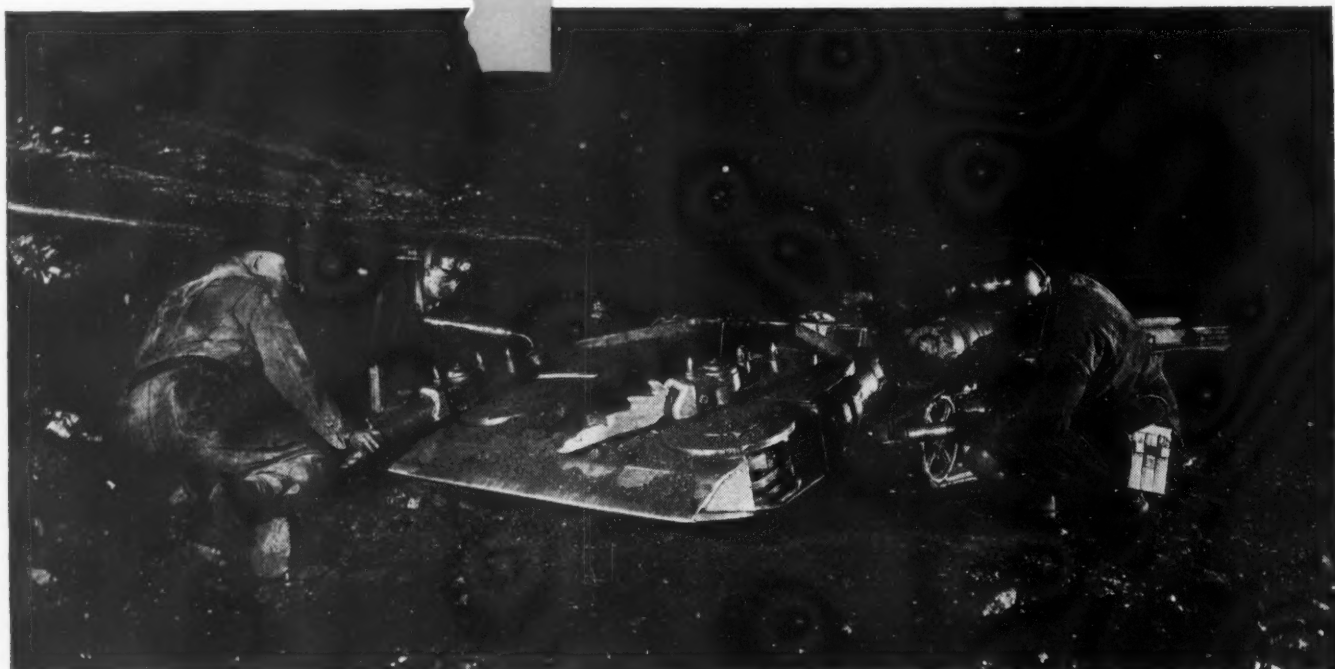
U.S.S. AMERCLAD CABLE

Gulf Mining Machine Lubricant B

is usually the remedy to difficulties like these:

The Gulf Lubrication Engineer "in the picture" checks the performance of Gulf Mining Machine Lubricant B. Application to this loading machine put a stop to bearing and gear failures.

*excessive wear in gears and bearings
loss of lubricant through leakage
lubricant throwoff or channeling
abrasive coal dust in gear cases
faulty lubrication under wet conditions*



EVERY NEW APPLICATION of Gulf Mining Lubricant B furnishes additional proof that this quality product is the answer to many of today's mining machine lubrication problems.

The body of Gulf Mining Machine Lubricant B prevents loss through leakage—keeps abrasive coal dust from entering gear cases. Superior lubricating qualities protect against excessive wear in gears and bearings. Exceptional adhesive properties insure full coverage of bearing areas—prevent throwoff or channeling. Resistance to the washing action of water insures effective lubrication under water conditions.

And Gulf Mining Machine Lubricant B does the job of two or three other lubricants—equally effective for the lubrication of both plain and anti-friction bearings, and for gears in drives and

transmissions — helps simplify lubricant storage and handling.

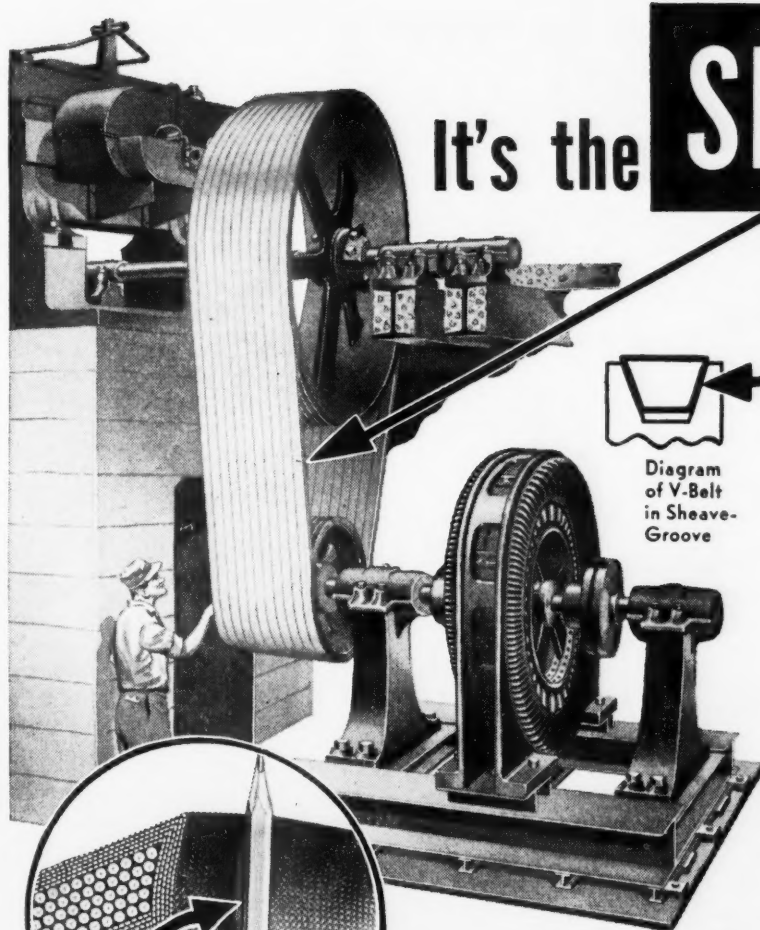
For further information on Gulf Mining Lubricant B, call in a Gulf Lubrication Engineer. Ask him to demonstrate the time-saving, cost-cutting advantages of this quality product. Write, wire, or phone your nearest Gulf office.



Gulf Oil Corporation • Gulf Refining Company

Division Sales Offices:

Boston • New York • Philadelphia • Pittsburgh • Atlanta
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SIDES

It's the **SIDES** of a V-Belt

that **GRIP** the Pulley
Pick-Up the **LOAD**
 and Really **Get** the **WEAR!**



Diagram
of V-Belt
in Sheave-
Groove

Every ounce of load a V-Belt carries must first be picked up by the sides of the belt. Clearly so, because only the sides come into contact with the pulley! The sides do all the GRIPPING on the pulley. The sides pick up the load. They transmit that load to the belt as a whole. And then, once more, the sides—and the sides alone—grip the driven pulley and deliver the power to it. Finally, the sides get **ALL THE WEAR** against the sheave-groove wall.

That is why you have always noticed that the sidewall of the ordinary V-Belt is the part that wears out first.

That's Why the **Concave Side**

(A GATES PATENT)

IS IMPORTANT TO YOU!

Clearly, since the sidewall is the part that wears out first, anything that prolongs the life of the sidewall will lengthen the life of the belt—and that's why the patented Concave Side is important to you.

The simple diagrams on the right show exactly why the ordinary, straight-sided V-Belt gets excessive wear along the middle of the sides. They show also why the Patented Concave Side greatly reduces sidewall wear in Gates Vulco Ropes. That is the simple reason why your Gates Vulco Ropes are giving you so much longer service than any straight-sided V-Belts can possibly give.

and the CONCAVE SIDE is more important NOW than ever before

Now that Gates **SPECIALIZED** Research has resulted in Super Vulco Ropes capable of carrying much heavier loads—fully 40% higher horsepower ratings—the sidewall of the belt is called upon to do even more work in transmitting these heavier loads to the pulley. Naturally, with heavier loading on the sidewall, the life-prolonging Concave Side is more important now than ever before!



Fig. 1
Straight Sided
V-Belt



Fig. 1-A
How Straight Sided V-Belt Bulges
When Bending Around Its Pulley

You can actually feel the bulging of a Straight-sided V-Belt by holding the sides between your finger and thumb and then bending the belt. Naturally, this bulging produces excessive wear along the middle of the sidewall as indicated by arrows.



Fig. 2
Gates V-Belt with
Patented Concave
Sidewall

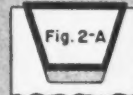


Fig. 2-A
Showing How Concave Side of Gates
V-Belt Straightens to Make Perfect
Fit in Sheave Groove When Belt is
Bending Over Pulley.

No bulging against the sides of the sheave groove means that sidewall wear is evenly distributed over the full width of the sidewall—and that means much longer life for the belt!



The Mark of **SPECIALIZED** Research

GATES VULCO ROPE DRIVES

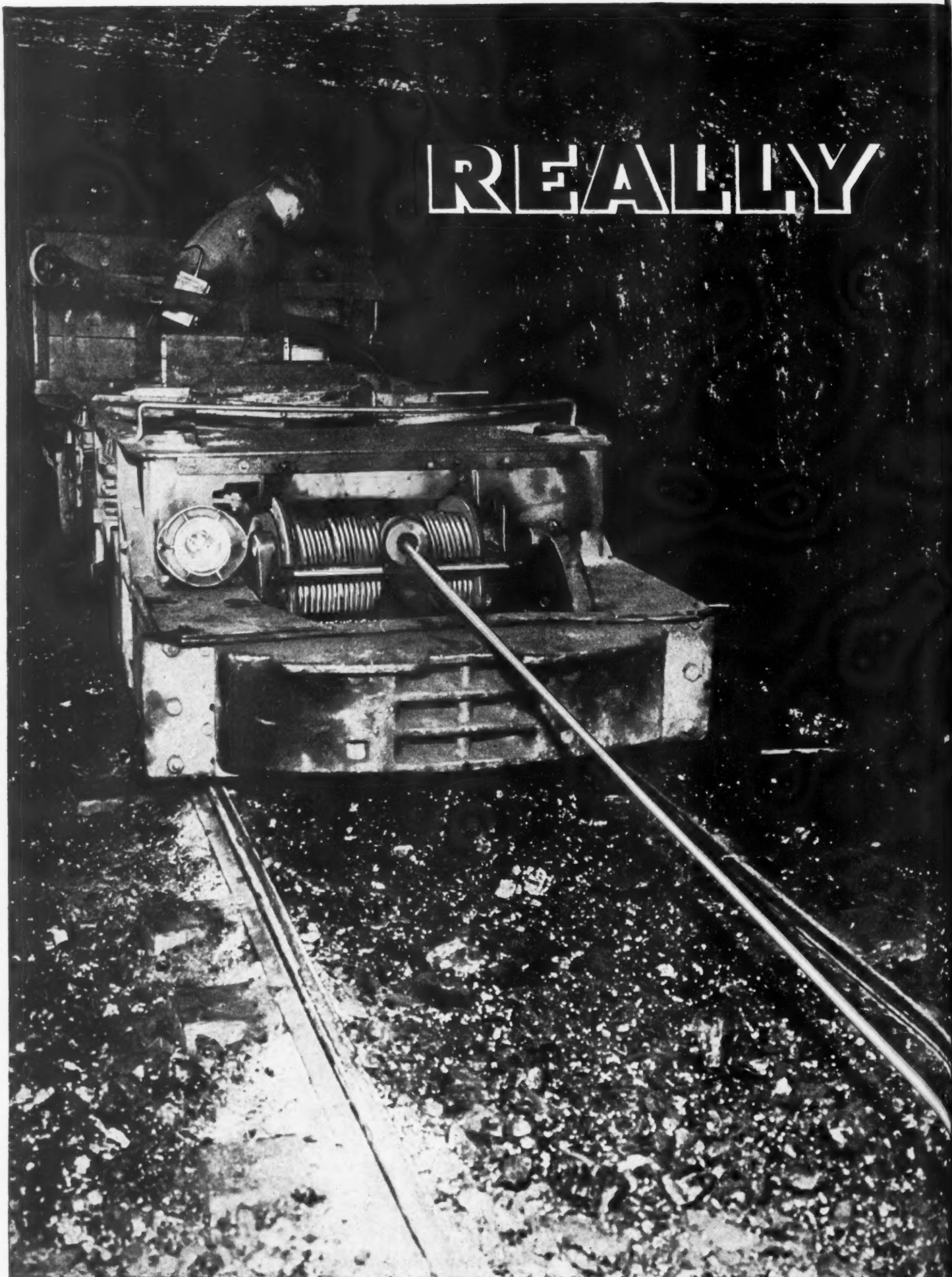
Engineering Offices
and Jobber Stocks

IN ALL INDUSTRIAL CENTERS

of the U. S. and
71 Foreign Countries

THE GATES RUBBER COMPANY
 "The World's Largest Makers of V-Belts"
DENVER, U. S. A.

REALLY



FILLS THE BILL...

EXPRESSLY DESIGNED for mine locomotive reel operation, here's cable that will do your job and *keep on doing it!* Approved by the Pennsylvania Bureau of Mines (P-111), Roebling Locomotive Reel Cable has extra flexible stranded conductors, with high performance synthetic rubber insulation reinforced by high strength cotton cord. Its outer sheath of a neoprene compound is lead-mold cured to give it maximum density and remarkable resistance to wear, impact, oils and water.

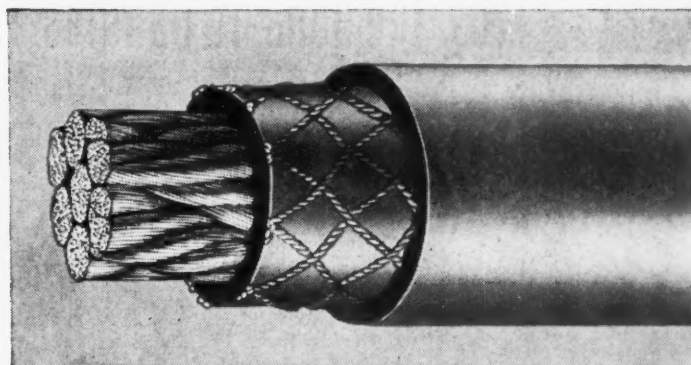
Whatever your requirement, there's a Roebling Locomotive Reel Cable to meet it, for it's made in a complete range of sizes. Like other types of Roebling power cables for mining use, its manufacture includes *extras* that are standard with Roebling . . . extras that take more time, materials and labor but assure you thoroughly dependable performance, new measures of service life and genuine economy.

Your nearby Roebling Distributor will be glad to help you with your cable problems and to give you a guiding hand in cable selection and maintenance. His help costs you nothing and may prove of important value. Write or call him for prompt assistance.

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★ WIRE ROPE AND STRAND ★ FITTINGS ★ SLINGS
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A CENTURY OF CONFIDENCE

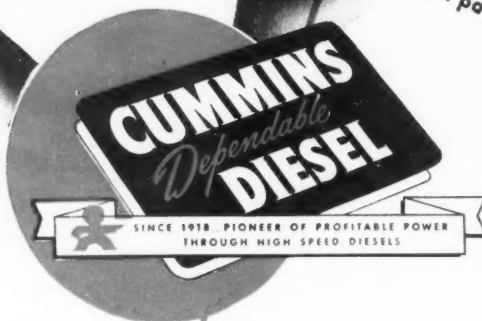




Proved Versatile

by the jobs it handles

On-highway trucks
Off-highway trucks
Earth-moving equipment
Shovels, clamshells, draglines
Yarders and loaders
Drilling rigs and pumps
Aggregate plants
Sawmills and planer mills
Cotton gins
Generating sets
Locomotives and motorcars
Fishing, work and pleasure boats
Industrial power units

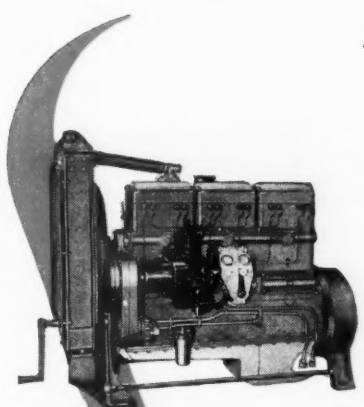


Name your job . . . any job
requiring single engines up to 275 hp . . . "multiples" up to 1440 hp . . .
and there is a Cummins Diesel designed to perform that job dependably and
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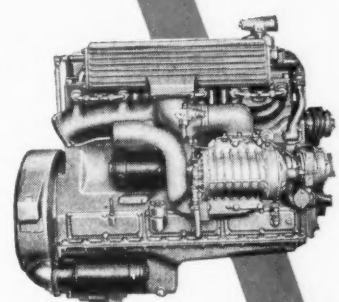
The 38 production models within the four basic series of Cummins Diesels . . .
models fitted specifically to your varying requirements . . . provide this versatility.

The long list of applications in which Cummins *Dependable* Diesels are
establishing performance records daily is proof of their flexibility and
versatility . . . is your assurance that they can handle your job more profitably than
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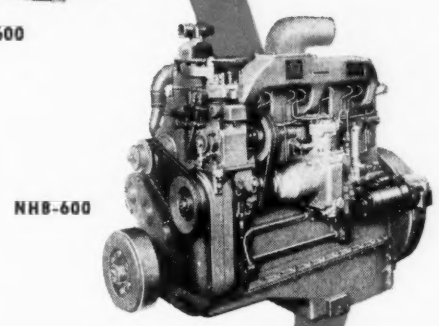
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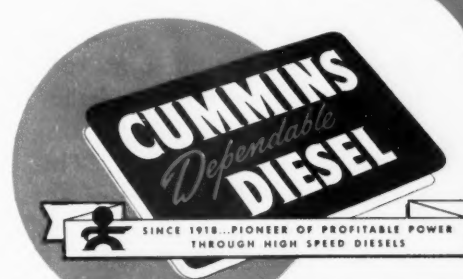
HIP-600



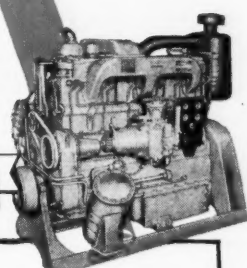
HBS-600



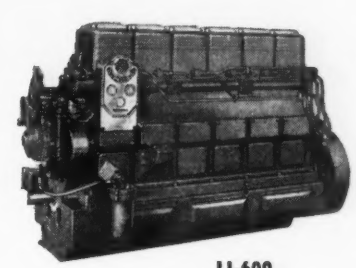
NHS-600



SINCE 1918...PIONEER OF PROFITABLE POWER THROUGH HIGH SPEED DIESELS



NHS-600



LI-600

More Tonnage . . . Lower Costs

In stripping, hauling, generating, pumping . . . every kind of heavy-duty mining service . . . Cummins Dependable Diesels have proved themselves to be sources of *profitable power* . . . handling more tonnage in less time and at lower costs. Smaller quantities of low-cost fuel . . . plus an inbuilt ruggedness that assures less downtime . . . have made Cummins Dependable Diesels profitable power on hundreds of jobs such as yours. There is a Cummins Diesel Engine designed for every mining job requiring single engine output up to 275 hp.

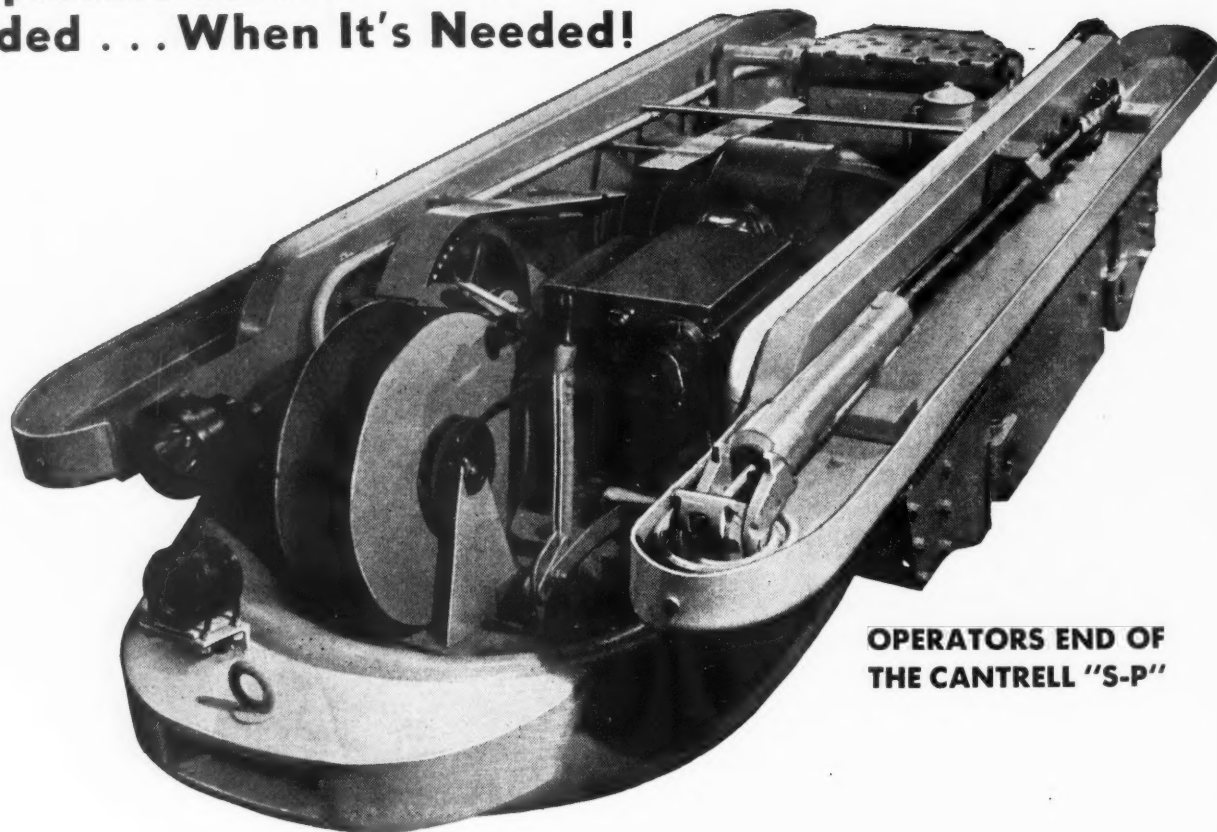
CUMMINS ENGINE COMPANY, INC.
COLUMBUS, INDIANA

SPECIFICATIONS

Series	Bore and Stroke	Piston Disp. (Cu. In.)	Maximum Rating (H.P. and R.P.M.)	Net Weight* (Lbs.)	Dimensions*
H-600	4 7/8 x 6	672	150 @ 1800	2160	57 x 30 x 46
HS-600	4 7/8 x 6	672	200 @ 1800	2540	58 x 32 x 47
NH-600	5 1/8 x 6	743	200 @ 2100	2600	59 x 41 x 63
NHS-600	5 1/8 x 6	743	275 @ 2100	3000	59 x 41 x 61
L-600	7 x 10	2309	250 @ 1000	7590	92 x 44 x 58

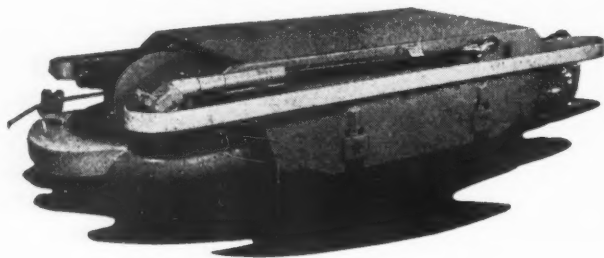
*Approximate for basic engine. Does not include accessories.

THE CANTRELL "S-P"... For Compressor Service Where It's Needed ... When It's Needed!



**OPERATORS END OF
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**A Cantrell "S-P" Compressor
with standard safety top in
place.**



Wherever and whenever you need on the spot service, you'll find the Cantrell "S-P"-Self-Propelled Air Compressor always ready to go. It takes your crew to the job, delivers dependable air compressor service and returns ... all under its own power. A simple shift of a lever changes the unit from locomotive to compressor service.

The Cantrell "S-P" is actually a two-ton locomotive and compressor combination, handling, in addition to its compressor work, jobs like ditch lining, leveling haulways, shifting mine cars, pumps and mining machines, hauling repairs, riveting and blowing sub stations. This versatility is a mighty important feature for mine operators who want to keep their heavy locomotives and crews free for other work.

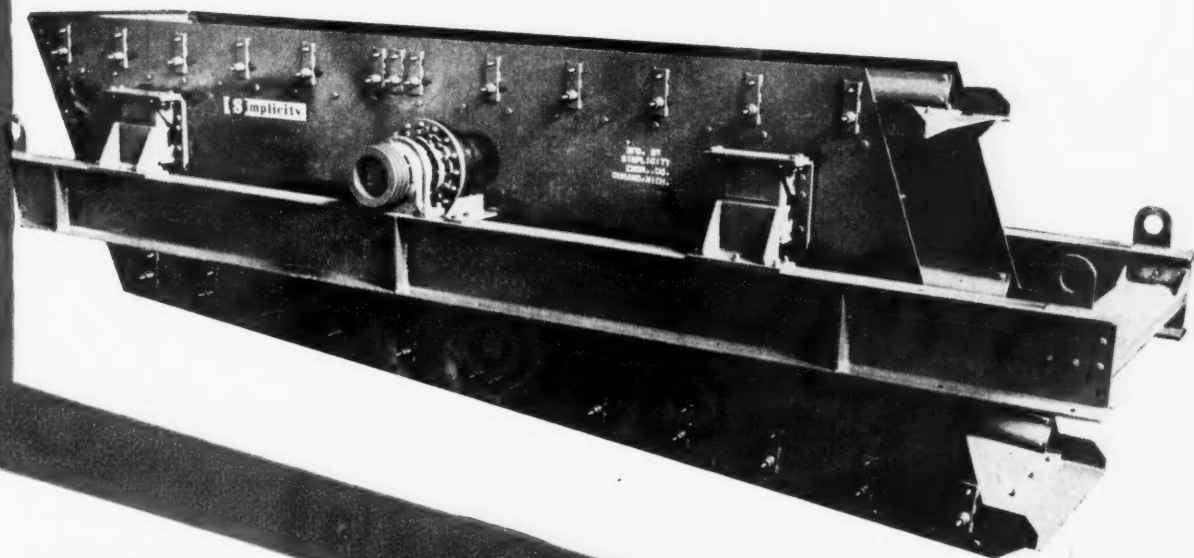
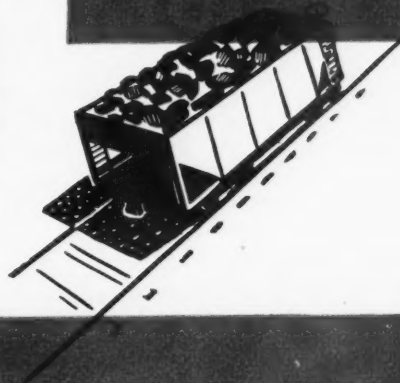
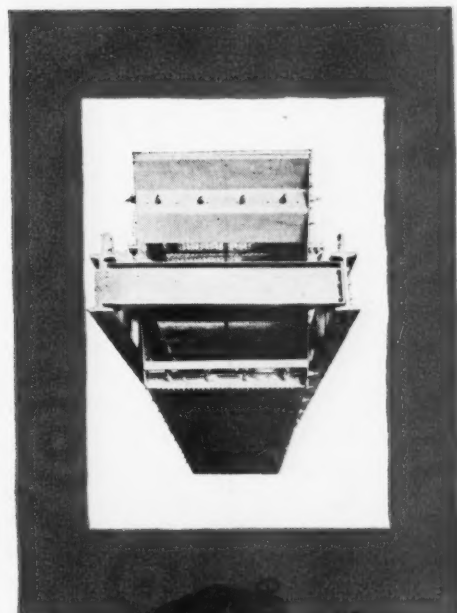
Why not write today for complete information about Cantrell Compressors. Five Types of compressors are built to meet every requirement of track and trackless mining, or for stationary shop use. One of them is certain to meet your requirements.

IMPERIAL-CANTRELL Mfg. Co.
J E L L I C O T E N N E S S E E



SIMPLICITY SOLVES THE DAMP COAL SCREENING PROBLEM . . .

For coal sizing this Simplicity 3' x 12' Model D 3-deck gyrating Screen can't be beat. The special Simplicity Ball-Tray Deck attachment keeps damp-coal moving right along and prevents building up on the wires of the screen cloth thereby eliminating "blinding". Small hard rubber balls in constant movement within the compartments of the Ball-Tray Deck, keep the screen cloth free at all times. Massive Simplicity construction, coupled with advanced Simplicity engineering, assures year-in, year-out dependability with absolute minimum maintenance and repair charges. Your nearby Simplicity representative will be glad to review your sizing and separating problems and recommend specific Simplicity Gyrating Screens that will speed production and profits for you.



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• FOR CANADA: CANADIAN BRIDGE ENGINEERING CO., LTD., WALKERVILLE, ONTARIO

**REPLACE
WORN CLUTCHES
NOW!**



Get New Clutch Service at $\frac{2}{3}$ the Cost

**AVAILABLE NOW FROM YOUR
INTERNATIONAL DEALER OR BRANCH**

INTERNATIONAL Factory-Rebuilt EXCHANGE CLUTCHES

Same International Warranty as for New Clutches

HERE's your chance to immediately replace worn, slipping clutches—quickly, easily—and save one-third the cost of new clutches.

Right now your International Dealer or Branch has International *Factory-Rebuilt* Clutches for all models of International Trucks.

These clutches are ready for immediate installation. You lose no time waiting for old clutches to be overhauled.

You get International Clutches that give the same service as new clutches—that carry the same International warranty.

And the cost to you is two-thirds or less.

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Your International Dealer or Branch has many other International Truck Exchange Units. Same quick installation as clutches. Same new unit service at a substantial saving. Get details, sure.

Motor Truck Division

INTERNATIONAL HARVESTER COMPANY

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*Tune in James Melton on "Harvest of Stars!"
NBC Sundays.*



INTERNATIONAL Trucks

Loads Out Faster



JOY LOADERS
ARE TIME-PROVED TO
REDUCE COAL HANDLING COSTS

Left below, the tonnage producing 11-BU loading out in a high seam operation.

Right below, the 14-BU provides high capacity loading in low seams.



There's a Joy Loader for Every Seam



12-BU for conveyor mining



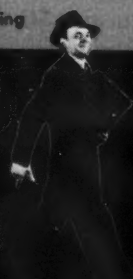
14-BU 30½", 33" and 36" high



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W&D CL 521

*Consult a
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HENRY W. OLIVER BUILDING • PITTSBURGH, PA. U.S.A.

Why midwest mine shifts loaders to

new

Superla Mine Lubricant No. 4

Tested in one hard-working Joy loader, Superla Mine Lubricant No. 4 sold itself into 7 more of these grease-lubricated loaders in a large midwest mine.

Introduced as one of a new and improved line of cutter and loader lubricants, Superla Mine Lubricant No. 4 showed its superior qualities in these four ways:

- 1** **Low repair costs.** During a 6-month test period with Superla Mine Lubricant No. 4, no clutch plates were replaced. No machine shutdowns or breakdowns occurred due to faulty lubrication.
- 2** **Good Lubrication.** With Superla Mine Lubricant No. 4 it was immediately apparent that no warm-up period was needed when starting loaders. The lubricant was light enough to permit easy starting, yet did not thin out excessively at operating temperatures.
- 3** **Ease of application.** Servicing presented no problem with Superla Mine Lubricant No. 4, which poured readily from the bung-type barrels and was dispensed easily from hand-operated grease guns.
- 4** **Low consumption.** During the test run with Superla, 10 to 15% less lubricant was used than previously had been required.

You can get these results of improved lubrication in your cutters and loaders with the new Superla Mine Lubricants. Grades are available for both grease- and oil-lubricated types of cutters and loaders. Each grade has been tested and proved in severest mine operation. The Stand-

ard Oil Lubrication Engineer in your locality will be glad to help you test these improved products in your machines. Write Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.



STANDARD OIL COMPANY (INDIANA)



Six Grades for lubricating any type of Cutter or Loader

No. 00. An oxidation-inhibited oil containing a detergent additive. It provides exceptionally clean operation and low oil consumption for oil-lubricated gear cases. Also suitable for loaders with dual systems.

No. 0. A high-quality additive-type oil similar to No. 00 except that it is a slightly heavier grade. It is designed for loaders with a single oil system.

No. 2. A soft, semi-fluid grease for lubricating gathering-head gear cases where greater fluidity is desired than that usually provided by most loader greases.

No. 4. A semi-smooth grease particularly resistant to thinning out under heat and mechanical working. At the same time it can easily be poured from the barrel bung at ordinary mine temperatures. It is especially designed for Joy loaders.

New Superla Mine Lubricants

No. 6. A grease of heavy consistency and good high-temperature characteristics. Its fibrous structure makes it particularly adaptable to gathering-head and general underground lubrication.

No. 8. A smooth grease having superior high-temperature characteristics. It is suitable for armature bearings and pressure-gun work where a grease of heavy consistency is desired.

STANDARD OIL COMPANY (INDIANA)



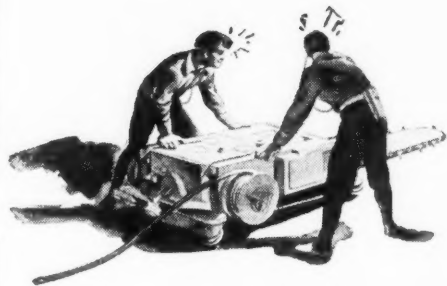
Famous for Safety and Service . . .



Securityflex^{*} **PARALLEL MINING CABLE**

- Cuts Short Circuits
- Meets Pennsylvania Flame Test
- Withstands severe overloads
- Resists abrasion
- Will not kink, twist or tear
- Meets Bureau of Mines diameter specifications

48453



...Assures uninterrupted mine operation

*Reg. U. S. Pat. Off.



ANACONDA WIRE AND CABLE COMPANY

25 BROADWAY, NEW YORK 4, N. Y.

No other dragline bucket



...can match the digging capacity of a PAGE AUTOMATIC!

Page AUTOMATICS dig right in at the first pull of the drag rope and get a full load within one to three bucket lengths regardless of the depth—20 ft., 100 ft., or more. This means that most of your operations are under or near the end of the boom point where the minimum amount of power is required for hoisting the load.

Perfect balance of the AUTOMATIC assures positive control whether loading or dumping. Quick loading features of AUTO-

MATIC buckets mean less wear and maintenance on the bucket, cables, and the dragline as well as minimum operator fatigue.

Hundreds of dragline operators in all kinds of digging have found that their AUTOMATICS dig more yards at a lower cost per yard than any other buckets they have ever used. For all the facts, see your construction equipment distributor or write for big, new free booklet, "How to Get the Most Out of Your Page Automatic Dragline Bucket."

PAGE ENGINEERING COMPANY

Clearing Post Office

Chicago, Ill.

PAGE

**DRAGLINE BUCKETS and
WALKING DRAGLINES**



Coal Executives Celebrate *Red letter days* at the mine..

Where there's a coal preparation plant, management's calendar is marked with memorable red letter days.

The day the contract was signed for the plant erection is one of them. That step took courage ... and a vision of future competitive markets where only specification fuel would continue to bring home the profits.

The plant opening day is another. Courage and vision are rewarded ... tons of coal moving to the top of the plant on automatic conveyors ... coming out at the bottom minutes later ... cleaned, dried, graded by smooth-flowing automatic equipment.

Most satisfying of all ... the financial report days to stockholders ... red letter days, indeed ... showing substantial earnings in black. Expert preparation paying off in dividends and satisfied customers.

It's traditional that McNally-built plants are profit-makers. The new streamlined plant at the Cuba mine is one of the latest. Like hundreds of others scattered over the globe it is devoted to making coal a better fuel and a dividend-paying product.

Our technical staff will be glad to explain how you can do it!



M'NALLY  PITTSBURG

MANUFACTURERS OF EQUIPMENT TO MAKE COAL A BETTER FUEL

McNally
The United Electric Coal
Companies Cuba Mine at
Cuba, Illinois. Preparation
plant processing 800 tph.

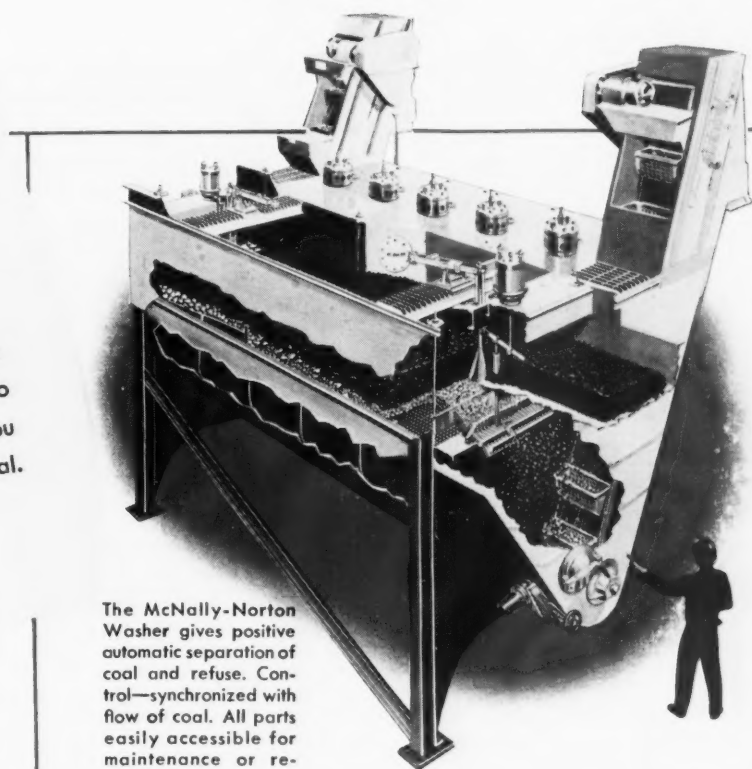
Production Executives Visualize Customer Satisfaction at a *Competition-Defying* Level

At last . . . production men can meet the most exacting specifications. They can deliver specification fuel that keeps customers enthusiastically satisfied. In the new streamlined plant, coal is upgraded to specification fuel at the touch of a button.

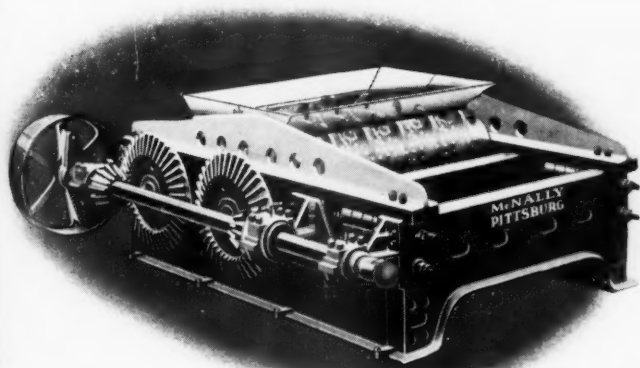
In this plant, 800 tph are washed, dried, graded automatically. Inherently fine coal is improved by removing impurities. Ash is controlled to a definite, fixed percentage.

The cost of preparation is just a few cents a ton; pays off in worker satisfaction, product improvement, and dividends.

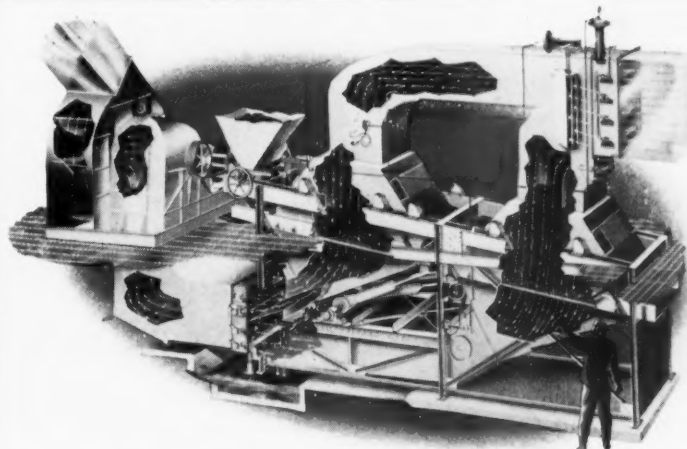
The McNally Pittsburg technicians who design and build these plants will be glad to consult with you and explain just what you can accomplish with your particular raw coal.



The McNally-Norton Washer gives positive automatic separation of coal and refuse. Control—synchronized with flow of coal. All parts easily accessible for maintenance or replacement.



Equipment at Cuba mine includes two McNally Heavy-Duty Breakers which break large lumps ranging in size to 3000 lb each. Retain lump sizes with minimum of degradation.



The McNally-Vissac downdraft Thermal Dryer, such as used at the Cuba plant, requires less than ordinary thermal dryers. Squeezes every drop of free moisture from coal before heat is applied.

McNally Pittsburg Manufacturing Corporation—Plants: {Pittsburg, Kansas
Wellston, Ohio

Engineering & Sales Offices: Pittsburg, Kan. • Chicago (1), Ill. • Pittsburgh (22), Penna. • Wellston, Ohio • Caixa Postal 1310, Rio de Janeiro, Brazil

41% of Solids Pumps to "A-C"

**in Indiana
and Western
Kentucky
Coal Fields**



*-and 36% of these
Replaced other makes!*

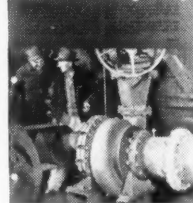
YES, 2 OF EVERY 5 sludge or fine coal handling pumps in this important coal area are Allis-Chalmers Solids Pumps. They're designed to give you *all eight* of these features or benefits:

1. **Longer pump life**—Their special design and abrasion resistant alloy construction have given pump life up to four times that of comparable pumps.
2. **All parts are easily accessible**—Downtime is cut drastically.
3. **Five principal parts**—That means fewer parts to wear out, lower inventory.
4. **Parts inventory reduced**—Parts are interchangeable within different size pumps.
5. **Easy servicing**—It is easy to service stuffing box and adjust wearing clearances.
6. **Removable element**—Entire rotating element removable without disturbing piping.
7. **Easy to regulate**—You can regulate pumping capacities quickly up or down without touching pump or pump parts, by simply changing Texrope V-belt drive ratio or drive and motor.

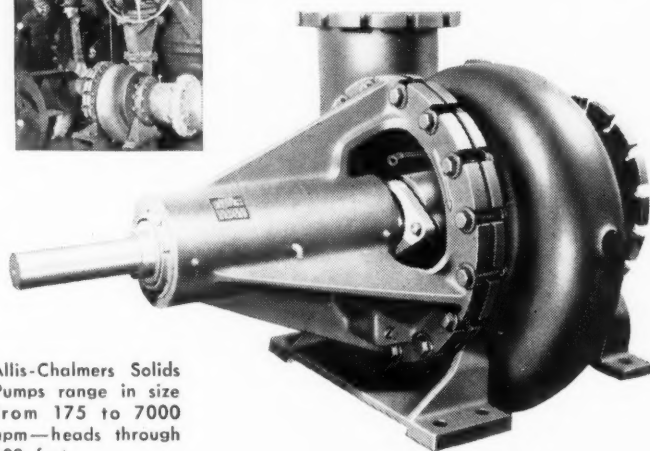
8. **Simple piping arrangements**—Modification to any of seven discharge positions 45° apart may be easily made in the field.

Your nearby Allis-Chalmers office or dealer will be glad to give you the whole story on these pumps. Or you can write ALLIS-CHALMERS, MILWAUKEE 1, WIS.

*** Solids-Handling Pump**



Call your nearby "A-C" dealer or office for Bulletin 08B6381A for additional Solids Pump information. A-2272



Allis-Chalmers Solids Pumps range in size from 175 to 7000 gpm—heads through 100 feet.

ALLIS-CHALMERS

One of the Big 3 in Electric Power Equipment — Biggest of All in Range of Industrial Products





SMOOTHER HANDLING... BY A DAM SITE!

Another Top Performance by a BWH Product

In refacing a big Western dam to a thickness of eight feet, grout had to be forced through slotted pipes to a depth of 170 feet . . . and smooth, uniform distribution was absolutely essential.

BWH engineers unhesitatingly recommended a flexible joint of rugged BWH Grout Hose that would permit an even flow of grout from the master mixer into redistribution hoppers — even under pressure up to 500 pounds!

In addition, when redistribution hoppers that kept the lines and slotted pipes supplied with grout were full, the BWH Hose not only

had to withstand the surge of pressure caused by abrupt shut-offs, but also had to route excess grout back to the master mixer.

24 hours a day, this "shaker" kept lines full, and only occasional turns of the hose were required to prevent settling of the grout.

When the job was successfully completed, this tough hose showed almost no sign of wear. The secret of its durability is an abrasive-resistant rubber inner tube and a carcass of specially woven extra-strong duck. For additional stamina, a spirally-wound band of braided, high-tensile wire is imbedded in the

rubber. Tube and carcass are then encased in a strong rubber cover, able to withstand hard knocks and operating hazards.

Grout Hose is just one of the many high-quality products manufactured by BWH. Whatever your needs for industrial rubber goods, look to BWH products for dependable ruggedness—BWH distributors for dependable service!

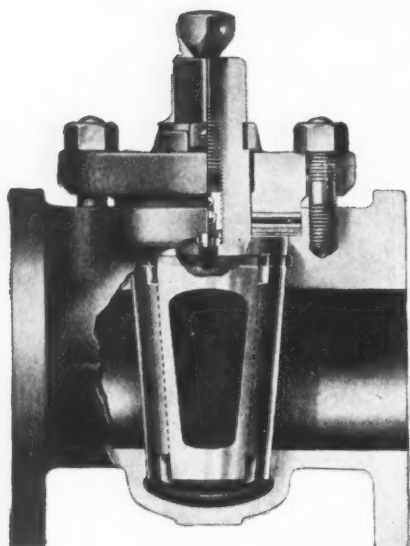
HAVE YOU A JOB WHERE STAMINA COUNTS?

Bring us your toughest problems . . . we're specialists in solving them. Consult your nearby BWH distributor, or write us direct.

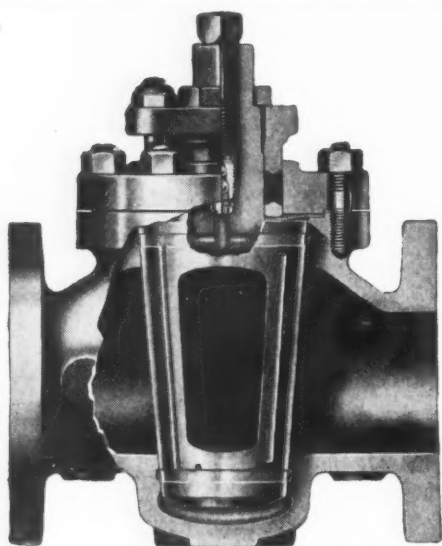
Another Quality Product of
BOSTON WOVEN HOSE & RUBBER COMPANY

Distributors in all principal cities

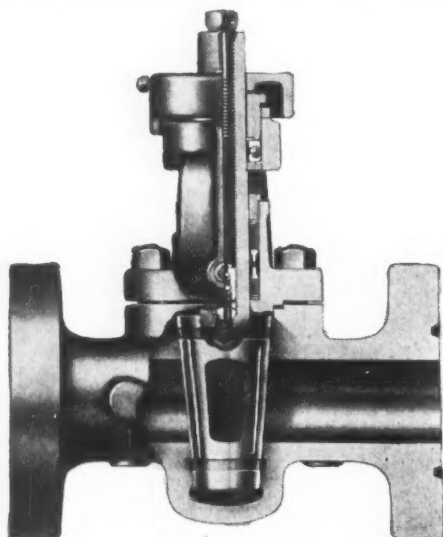
PLANT: CAMBRIDGE, MASS., U.S.A. • P.O. BOX 1071, BOSTON 3, MASS.



Single Gland Type



Regular Gland Type



Ball Bearing Type

FOR HANDLING

*Acids...
Solvents...
Sludges...*

**and other
troublesome liquids—**

USE WALWORTH LUBRICATED PLUG VALVES

When handling acids, condensates, dyes, oils, solvents, solutions, slurries and hundreds of similar "troublesome" liquids, you get better control, more dependable service and lower operating costs with Walworth Lubricated Plug Valves.

These valves have proved their ability to give easy operation . . . fast action . . . tight shut off . . . greater protection against corrosion. Turning is smooth and easy; just a $\frac{1}{4}$ turn from full-opening to full-closing. Moreover, Walworth Lubricated Plug Valves are tightly sealed against leaks — *whether open or shut.*

Walworth Lubricated Plug Valves are available in sizes $\frac{1}{2}$ " to 24" for pressures from 125 to 5,000 psi, and for vacuum requirement. For further information about Walworth's Complete Line of Lubricated Plug Valves, see your Walworth distributor or write for Catalog No. 46L.

WALWORTH
valves and fittings

60 EAST 42nd STREET, NEW YORK 17, N. Y.

TIREX CABLES

*Protect
Your
Investments*



*M*INING machines are big investments. They cost you many hard-earned dollars. But the best machine is only as good as the electric cable that powers it. If the cable fails, the machine is useless. You must "follow through" when you choose your equipment; be as sure of your cables as you are of your machines.

Simplex-TIREX portable cables feature the qualities that assure trouble-free service under all operating conditions. They're flexible! They're tough! Their jackets of Selenium-Neoprene are specially compounded to provide protection against oils, acids, moisture and sunlight. They are cured in lead for long-lasting resistance to wear and tear. They will not support combustion — all TIREX cables have approval No. P-101 of the Department of Mines, Commonwealth of Pennsylvania.

Consider these features. All add up to dependable performance and that's what you'll get from TIREX-equipped machines.

TIREX cables are available in sizes and types to meet every requirement for use on shovels, cranes, cutters, loaders, and locomotives. The TIREX line also includes cords and cables for welding machines, drills, pumps, and motors.

Simplex — WIRES & CABLES

SIMPLEX WIRE & CABLE CO., 79 SIDNEY ST., CAMBRIDGE 39, MASS.



**We're as careful
of YOUR money
as we are of
our own**

When you ask Bethlehem to design and furnish a prefabricated track layout, you're telling us to go ahead and spend your money. That's what it amounts to. And believe us, we're careful!

A Bethlehem prefabricated system is planned track, made to fit your individual mine. The first step is a detailed study of your workings by a Bethlehem engineer. After this study is completed, he submits a track plan for your

approval. It's the layout that, in his opinion, will do the best job for you . . . the simplest layout possible. It is not loaded up with expensive extras.

You'll find, too, that the track he recommends costs little to install. No more than two men are required to handle any of its elements. Parts are match-marked to simplify installation. The number of rail lengths and curvatures is held to an absolute minimum.

A planned system like this means faster, safer haulage; fewer derailments; less inspection and maintenance. All this pays off in lower cost per ton hauled.

For further details, ask one of our engineers to call. He'll gladly come to your mine and talk shop.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

*On the Pacific Coast Bethlehem products are sold by
Bethlehem Pacific Coast Steel Corporation*

Export Distributor: Bethlehem Steel Export Corporation



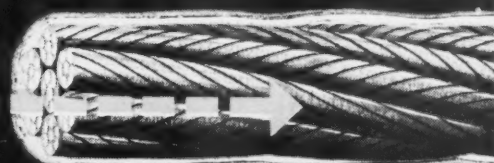
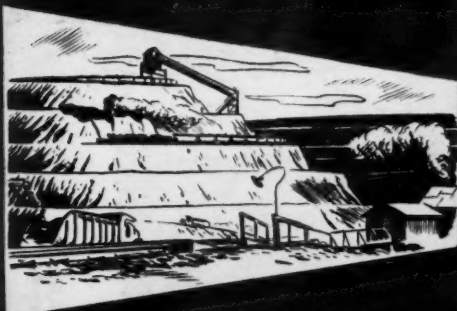
BETHLEHEM PREFABRICATED TRACK

U. S. Rubber designs safer
MINING MACHINE AND
LOCOMOTIVE CABLES

INSIDE and OUT

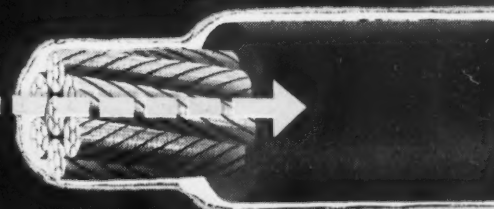
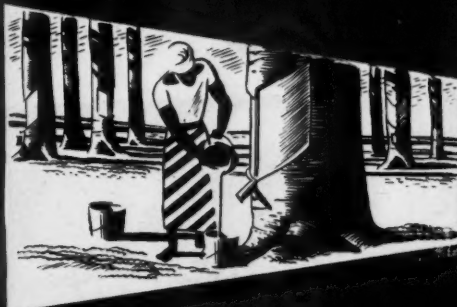
U. S. ROYAL CABLES ARE DESIGNED FOR YOU

TO INSURE TOP PHYSICAL AND ELECTRICAL PROPERTIES, the conductors of U. S. Royal Cables are of annealed coated copper, the stranding of which is designed specifically for the service requirements of mining machine and locomotive cables. The greatest possible flexibility and efficiency are provided right from the start.



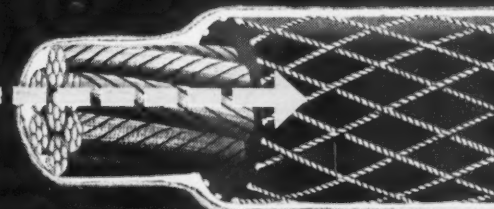
COPPER CONDUCTORS

RUBBER INSULATES BEST! Made of the finest rubber compound, this U. S. Rubber insulation maintains circuit integrity and long life through its high physical and electrical qualities. The compound has a tensile strength as high as 1400 pounds per sq. in. to provide top safety.



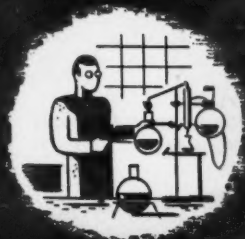
RUBBER INSULATION

STRONG COTTON BRAID made of the finest long staple fibers covers the insulation, and comprises a heavy, sinewy reinforcement for added reliability and safety.



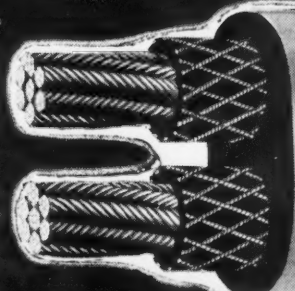
COTTON BRAID OF LONG STAPLE FIBERS

IN THE LABORATORY United States Rubber Company scientists developed a special, tough, pressure cured Neoprene jacket, which provides maximum resistance to abrasion, cutting, heat, moisture, and especially oil. In addition, U. S. Royals must pass 7 gruelling "torture" tests before being certified as safe for your toughest jobs. Write for free sample and booklet to Wire and Cable Department, United States Rubber Company, 1230 Avenue of the Americas, New York 20, N. Y.



RUGGED NEOPRENE JACKET

Available in black or
in the new yellow
for extreme visibility



U.S. ROYAL

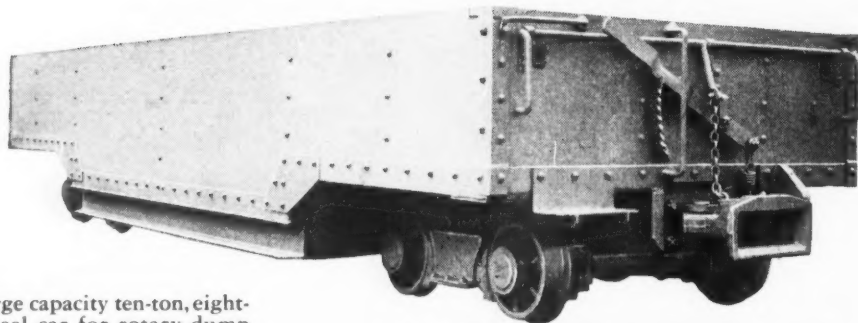
SAFETY
TESTED



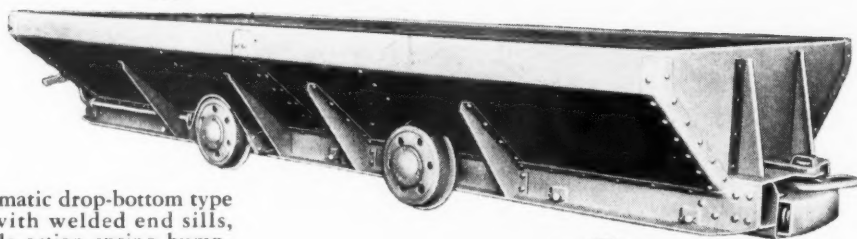
A PRODUCT OF
U.S. RUBBER
SERVING THROUGH SCIENCE

UNITED STATES
RUBBER COMPANY

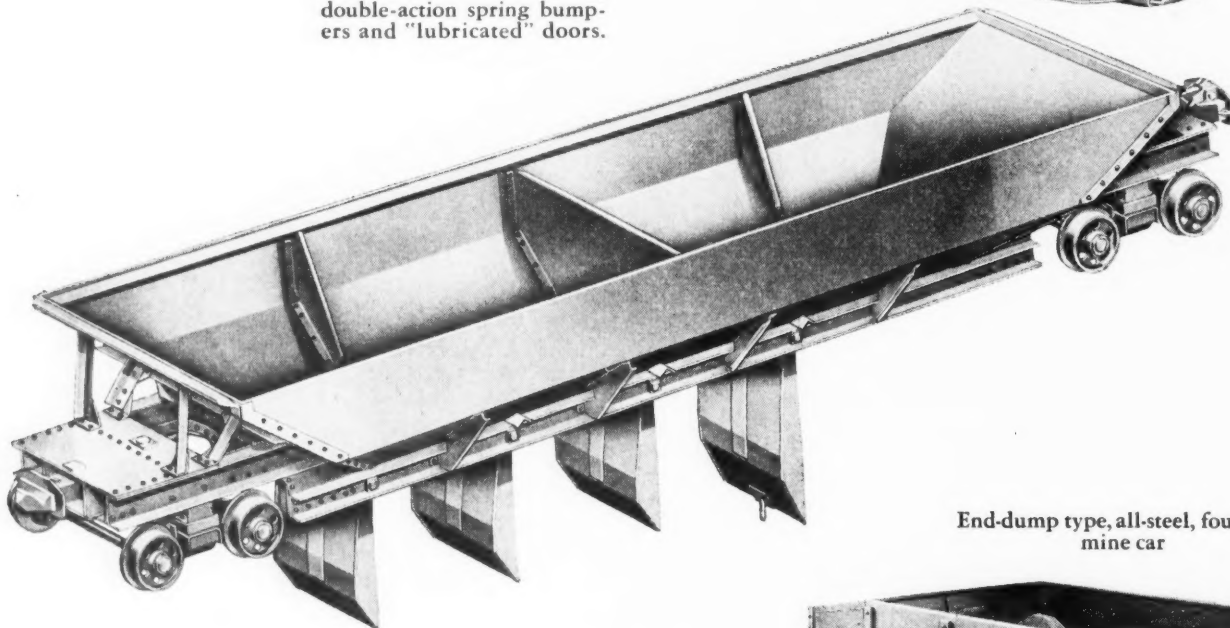
High Production



Large capacity ten-ton, eight-wheel car for rotary-dump operation — with automatic couplers.

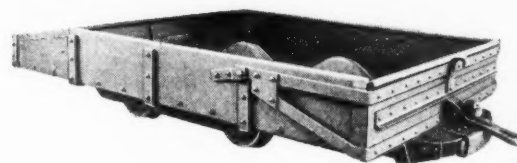


Automatic drop-bottom type car with welded end sills, double-action spring bumpers and "lubricated" doors.



Automatic drop-bottom, eight-wheel car, twelve-ton capacity with "lubricated" doors and automatic couplers.

End-dump type, all-steel, four-axle mine car



MINE

Low Cost!

FOR ALL TYPES OF CARS



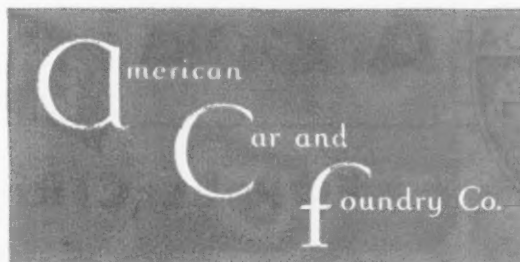
Regardless of your requirements...automatic drop-bottom, end-dump, rotary-dump...every modern **A.C.F.** Mine Car will step up your coal output. Their sturdy construction and speed of dumping increases loading machine efficiency, resulting in lower costs per ton.

Remember, mine modernization starts with smooth-rolling transportation. Many coal mines that lead in production and efficiency use **A.C.F.** Mine Cars. Why not contact our Sales Representatives in regard to your transportation problems.

Rotary-dump, all-steel, four-axle mine car.

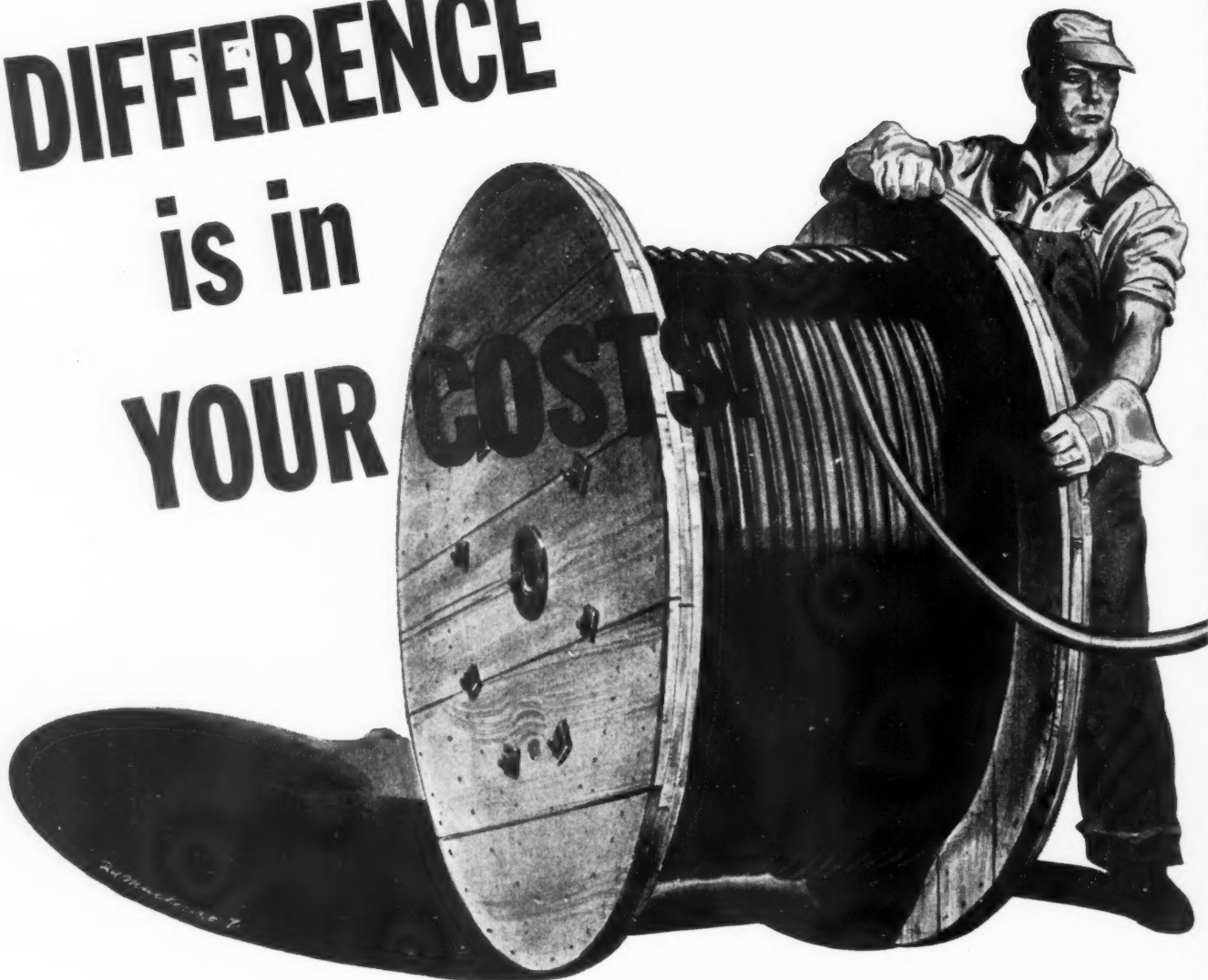


CARS



NEW YORK
CHICAGO
CLEVELAND
WASHINGTON
HUNTINGTON, W. VA.
ST. LOUIS
BERWICK, PA.
PITTSBURGH
PHILADELPHIA
SAN FRANCISCO

**THE BIG
DIFFERENCE
is in
YOUR COSTS**

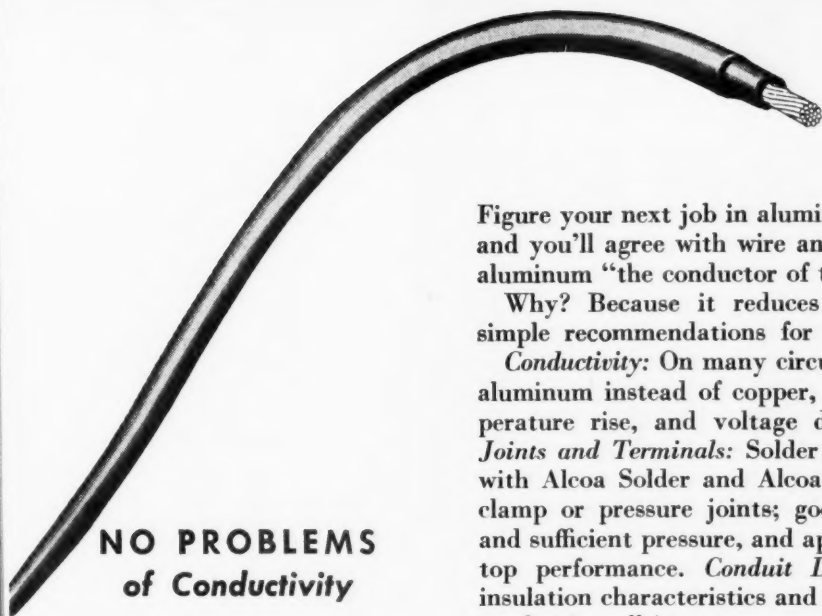


ALCOA *EC* ALUMINUM

FOR ELECTRIC WIRE AND CABLE

ALUMINUM

**gives you everything you want in a conductor—
cuts a big chunk off your wire and cable investment!**



**NO PROBLEMS
of Conductivity**

**NO PROBLEMS
of Joints and Terminals**

**NO PROBLEMS
of Conduit Layout
AND
Your Supplier
Has It**

Figure your next job in aluminum! See how much it cuts your costs, and you'll agree with wire and cable manufacturers who are calling aluminum "the conductor of the present and future".

Why? Because it reduces over-all wiring costs. Here are the simple recommendations for installing it:

Conductivity: On many circuits, it will be sound engineering to use aluminum instead of copper, size for size. Type of insulation, temperature rise, and voltage drop will be the determining factors.

Joints and Terminals: Solder aluminum to itself or to other metals with Alcoa Solder and Alcoa Flux, using standard methods. Make clamp or pressure joints; good practice calls for generous contact and sufficient pressure, and application of joint compound for lasting top performance. **Conduit Layouts:** A comparison of wire sizes, insulation characteristics and costs will show you that a job "figured in aluminum" imposes no conduit problems. And aluminum's lightness makes it easier to pull.

Your men will like the lighter weight of wire and cable made of Alcoa E. C.* Aluminum. For instance, the weight of a 500 mcm insulated aluminum cable is less than half the weight of an identical copper cable.

Aluminum conductor is here to stay. The advantage of "figuring it in aluminum" will accrue first to those mines who are quickest to adapt this modern metal to new or modernized wiring systems. Ask your wire and cable supplier, or write us for further information. ALUMINUM COMPANY OF AMERICA, 1763 Gulf Building, Pittsburgh 19, Pennsylvania. Sales offices in principal cities.

Insulated and sold by leading wire manufacturers



*E. C.: Electrical
Conductor
Aluminum

BIG



TOURNADOZERS

3
2
W
To
tim
dir
To
in
ab
22
tha
To
sel
ele
fir
to
me
pre
inte
Yo
mo
tion

300 h.p. PUSHER loads up to 29 heaped yds. in less than 1 min.

WITH TODAY'S biggest team of dirtmovers, the B Tornadozer and B Tournapull, you have, for the first time, an ideal combination of BIG matched high-speed dirtmoving equipment. The new B pusher behind the B Tournapull gets big loads fast — up to 29 heaped yards in less than a minute. This dozer has speed and maneuverability to synchronize its full 300 h.p. instantly with the 225 h.p. on the Tournapull . . . it's this matched equipment that gives you accurate pushing and cutting control. Both Tournapull and Tornadozer have instantaneous gear selection without shifting . . . both have instantaneous electric controls. Both units drive on big (24.00 x 29) tires built with the new tapered beads and rayon cords to take safely, the tremendous traction developed . . . tremendous loads carried. These new type tires permit low pressure flotation for work in sand and muck. They're interchangeable — from Tornadozer to Tournapull.

You will see this B combination on a lot of the big dirt-moving projects of 1948. It follows the LeTourneau tradition — always seeking to give you better tools for

increased production and lowest cost. With this new B Tournapull and B Tornadozer team we can give you a NEW and more profitable "lowest net cost per yard."

See your LeTourneau Distributor now. Ask him to show you how these "B for BIG" LeTourneau dirtmovers can improve YOUR profit possibilities for 1948.

Specifications

B TOURNAZOZER 300 hp Diesel		B TOURNAPULL 225 hp Diesel	
Engine			
Speeds			
1st gear	Fwd. and Rev. 1.6	Fwd. and Rev. 1.88	
2nd gear	Fwd. and Rev. 3.3	Fwd. and Rev. 3.75	
3rd gear	Fwd. and Rev. 6.8	Forward	7.50
4th gear	Fwd. and Rev. 13.6	Forward	15.00
Tires	24.00 x 29	24.00 x 29	
Control	Tournatorque electric	Tournatorque electric	
Transmission	Constant Mesh-Tournamatic	Constant Mesh-Tournamatic	
Drive	4-wheel	2-wheel	
Working Weight	25 tons	22 tons empty	
Load Capacity	Blade: 5½ cu. yds. top soil	Scraper: 26 yds. struck (35-ton load limit)	

R. G. LeTOURNEAU, Inc.
Peoria Illinois

TOURNAPULLS

POINTING TRUE WEIGHT MEASUREMENT

FOR 118 YEARS...

FAIRBANKS-MORSE

SCALES

To men whose production . . . whose payment . . . whose purchases are measured by weight, the name "Fairbanks-Morse" is a guarantee of unfailing accuracy.

Modern Fairbanks-Morse Scales have added the advantages of automatic weighing and push-button recording to almost every conceivable weighing operation — including, no doubt, some similar to yours.

Ask a Fairbanks-Morse engineer about the latest developments in weighing instruments for *your* job at hand.

When it comes to scales...



FAIRBANKS-MORSE

A name worth remembering

DIESEL LOCOMOTIVES • DIESEL ENGINES • STOKERS • SCALES • MOTORS • GENERATORS • PUMPS • RAILROAD MOTOR CARS and STANDPIPES • FARM EQUIPMENT • MAGNETOS



Trouble takes a trip – via rubber elevator

The hose you see above is lifting "trouble" out of a coal mine.

It's being used to siphon off seepage water that collects in mines and causes costly slow-downs.

This job calls for more than just "any hose." It takes a hose that's specially designed, specially constructed for heavy-duty water suction service.

Monarch Water Suction Hose is that kind of hose. It's built by Hewitt Rubber to "take it" and come back for more—even under conditions of constant exposure to corrosion and abrasion.

Its smooth, internal fluidway virtually eliminates frictional resistance . . . assures fast water-flow. Its thick tube is especially compounded to withstand the scouring action of muds and other abrasive materials.

A reinforcing spiral of spring-steel wire is embedded in the hose carcass to prevent

collapse under heavy suction . . . and assure flexibility. A tough, abrasion-resistant cover provides full protection for the hose . . . assures long-lasting service in water suction operations.

So why not use Monarch Water Suction Hose for your drainage operations? You'll agree it's the right hose for more efficient, more economical service. For details, phone the Hewitt distributor listed in the classified section of your phone directory. Or write to Hewitt Rubber Division, 240 Kensington Avenue, Buffalo 5, N. Y.



You can depend on your industrial supply specialist

He's always ready to serve you. And he knows your job . . . your operations . . . your problems. Call on him at any time for advice. He'll recommend the exact Hewitt product especially designed to help *improve* the efficiency of your operations.



HEWITT RUBBER
DIVISION

HEWITT-ROBINS INCORPORATED
INDUSTRIAL HOSE • BELTING • PACKING

Monarch Water Suction Hose



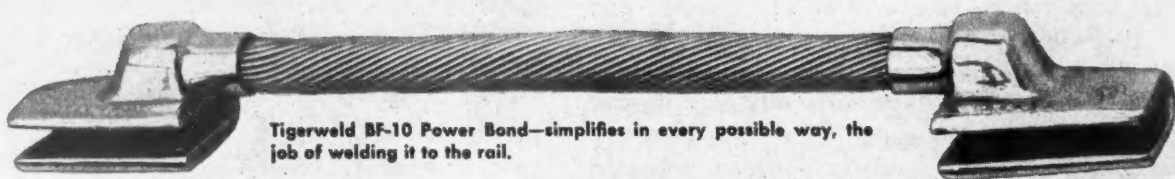
Battered but not broken

A COAL car was de-railed and fell on this U·S·S American Wedge Type Bond. A few of the wires were cut but the greater bulk of them remained undamaged. The bond was left in service.

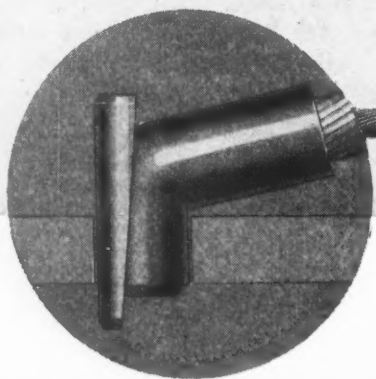
The rugged construction of U·S·S American Rail Bonds keeps them in service for years with very little maintenance. They have high fatigue resistance — do not shake loose in service.

The wedge-type bond is the easiest of all bonds to install—just drill a hole and hammer it in.

If you require the more permanent welded-type bond, the TIGERWELD BF-10 cuts installation time to a minimum with its self clamping feature.



Tigerweld BF-10 Power Bond—simplifies in every possible way, the job of welding it to the rail.



U·S·S American Wedge Type Bond—offers the easiest installation—yet holds with a tight grip. A hammer and a drill are the only tools required for installation of these bonds.

American Steel & Wire Company

Cleveland, Chicago and New York

Columbia Steel Company, San Francisco, Pacific Coast Distributors

Tennessee Coal, Iron & Railroad Co., Birmingham, Southern Distributors

United States Steel Export Co., New York

UNITED STATES STEEL



U·S·S American Rail Bonds

the vital requirement:

unfailing light
at the working place



dependably provided by **EDISON** ELECTRIC CAP LAMPS

for over thirty years . . .



The ever-increasing importance of *teamwork* in today's mining puts heavy emphasis on the *dependability* of production equipment, particularly the miner's personal cap lamp.

Light must not fail, for any member of a working group, if full production is to be maintained.

The EDISON Electric Cap Lamp provides unrivalled dependability for the wearer—unfailing, brilliantly effective light at the working place throughout the entire shift—and holds a more than thirty-year record of sterling performance. May we show you in a practical demonstration the reasons-why?

MINE SAFETY APPLIANCES COMPANY

BRADDOCK, THOMAS AND MEADE STREETS PITTSBURGH 8, PA.

District Representatives in Principal Cities

In Canada

MINE SAFETY APPLIANCES COMPANY OF CANADA LIMITED

TORONTO . . . MONTREAL . . . CALGARY . . . WINNIPEG . . . VANCOUVER . . . NEW GLASGOW, N.S.

SOUTH AMERICAN HEADQUARTERS

Casilla 733, Lima . . Agents in Principal Cities

MINE SAFETY APPLIANCES CO. (S.A.) (PTY) LTD.

Johannesburg, South Africa N'Dola—Northern Rhodesia



LUBE MEMO

1 1/3rd million miles without major overhaul!

*This Warren Transportation Co. truck ran
320,000 miles on RPM DELO OIL without major
overhaul. Fluid Drive Sterling-
6 cyl. Cummins Engine*



*Guy Warren
writes all 20 of
his heavy trucks give
fine performance
on RPM DELO Diesel
Engine Lubricating Oil
They travel
1,250,000 mi. yearly.*

*Av. gross load
74,000 lbs.*



*How does RPM DELO OIL Cut wear?
It's compounded to:
1. Stick to hot spots other oils leave bare
2. Stop bearing corrosion
3. Prevent engine deposits
4. Guard against sludge
5. Eliminate foaming*

*NOTE: Thank Guy Warren,
Hayward, Calif. for tip on RPM DELO OIL*

DISTRIBUTED BY
Gordon Lubricating Company
In Pennsylvania, Ohio, West Virginia, Kentucky
1023 Oliver Bldg., Pittsburgh, Pa. At. 5172
Andover Road, Columbus, Ohio
Kingswood 1495

DISTRIBUTED BY
Transcentral Oil Corporation
In Indiana, Illinois, Missouri, Michigan
600 S. Michigan Ave., Chicago, Ill.
HAR. 2677
Indianapolis, Ind. Market 1401



EATON

2-SPEED

Truck **AXLES**

**Get you there and back,
on any road—faster and
at lower cost!**

MORE THAN $\frac{3}{4}$ OF A MILLION EATON 2-SPEED AXLES IN TRUCKS TODAY

EATON MANUFACTURING COMPANY

Axle Division

CLEVELAND, OHIO

BEAT THE STEEL SHORTAGE

-use Steel that DOES more!

By replacing carbon steel with U·S·S COR-TEN or U·S·S MAN-TEN where economically applicable, you can:—

**1. Make your steel supply
go one-third farther, NOW.**

By taking advantage of the higher physical properties of these steels you can use thinner sections to produce units that weigh one-fourth less—that are substantially stronger and more durable—that require one-fourth less steel per unit. As a result you can produce as much as one-third more units from every ton of steel used.

**2. Make better products—
lighter, long lasting and generally
more profitable to the user, NOW.**

In addition to saving steel, lightweight construction with steel that *does* more has other proved economic advantages. Every pound of weight saved pays off in reduced operating costs, increased capacity to do work, and lower maintenance expense. These steels, by saving weight, make equipment more efficient—more productive.

3. Satisfy more customers, NOW.

The one-third *additional* units you can turn out, —without using more steel—mean that you can serve more customers, create more good will, and make more money because you have more units to sell. And you can do this NOW—without waiting for the completion of new steel making facilities.

**4. Get these benefits at little
or no greater cost per unit than NOW.**

Because both U·S·S COR-TEN and U·S·S MAN-TEN, like plain carbon steel, can be readily fabricated—because one fourth less steel is required per unit, with consequent reduction in shipping costs—because fixed charges can be spread over one-third more units—your finished product can be built at little or no increase in cost. Frequently, as in the case of freight cars, mine cars, trucks and trailers, it may actually cost less per ton of capacity.

TO HELP YOU *adapt these steels to your product immediately—
and with least change in your shop methods—we have a special
metallurgical and engineering staff thoroughly familiar with
what these steels can do. Phone, wire or write.*

U·S·S COR-TEN · U·S·S MAN-TEN · U·S·S ABRASION-RESISTING · U·S·S MANGANESE-NICKEL-COPPER



8-309

UNITED STATES STEEL

AMERICAN STEEL & WIRE COMPANY, Cleveland, Chicago & New York
CARNegie-ILLINOIS STEEL CORPORATION, Pittsburgh & Chicago · COLUMBIA STEEL COMPANY, San Francisco
NATIONAL TUBE COMPANY, Pittsburgh · TENNESSEE COAL, IRON & RAILROAD COMPANY, Birmingham
UNITED STATES STEEL SUPPLY COMPANY, Warehouse Distributors — Coast to coast · UNITED STATES STEEL EXPORT COMPANY, New York

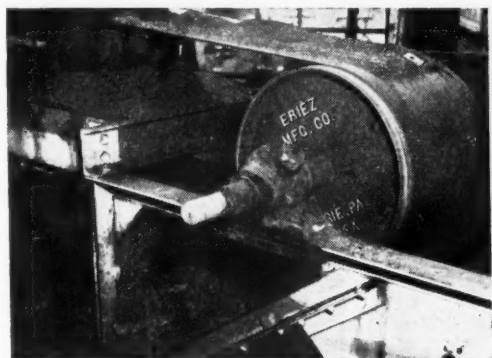
CUT OPERATING COSTS . . .

*with
Eriez*



Eriez "Giant" Plate Separator

NON-ELECTRIC *Permanent* MAGNETIC SEPARATORS



The Eriez Non-Electric Permanent Magnetic Pulley used as a head pulley in belt conveyors provides positive magnetic protection against the entry of tramp iron into expensive machines.

DESIGNED for quick, easy and economical installation into the bottom of gravity flow chutes, Eriez "Giant" Plate Magnets permit simple and efficient removal of tramp iron at an operating cost of zero . . . First cost is last cost . . . Powered by special Alnico magnets produced under General Electric patents, Eriez magnetic strength is permanent . . . a completely self-sustaining field provides uniform high density magnetic strength across the entire abrasive-resistant magnet face . . . no electric current is needed . . . no maintenance . . . Slip rings, coils, rectifiers and other electrical accessories are eliminated . . . You get other advantages too!

Adverse operating conditions, such as extreme heat, cold or moisture do not affect the efficiency of Eriez units . . . Protect your coal preparation equipment from tramp iron damage by installing Eriez-Engineered magnetic equipment today.

CLIP AND MAIL TODAY
Please send bulletin No. 102B

CA-2

We would like to know more about installation of ERIEZ on:
☐ Gravity Conveyors ☐ Mechanical Conveyors
☐ Equipment on Processing Machines

Name

Address

City

State

● *When It's Magnetic Protection . . . See Eriez First*



ERIEZ MANUFACTURING COMPANY

60 East 12th Street, Erie, Penna.

Thor "200" STOPER—

*the SMALLEST . . . the LIGHTEST
Stoper Rock Drill Ever Developed!*

Weight—Only 75 Pounds
Length—Only 55-½ inches
Packs the Power of Heavy Stopers
Easy to Carry
Easy to Lift
Easy to Maneuver at All Angles
Designed for Easy Handling By
Miners of Small Stature

Here it is—the machine that eliminates drudgery from stoping . . . the machine that will increase the usage of stopers and double the operator's daily drilling footage—the completely new Thor "200".

In production now for immediate delivery to mines and construction projects, the Thor "200" has already been tested and approved on every type of operation . . . *and by the smallest operators on the mine crew!*

Before you consider any stoper try the Thor "200" first—a demonstration will convince you. Mail the coupon on the opposite page today!

INDEPENDENT PNEUMATIC TOOL COMPANY

600 W. Jackson Boulevard, Chicago 6, Illinois

Export Division: 330 West 42nd St., New York 18, New York

Birmingham	Boston	Buffalo	Cincinnati	Cleveland	Denver	Detroit	Houston
Los Angeles	Milwaukee	New York	Philadelphia	Pittsburgh	St. Louis	St. Paul	
Salt Lake City	San Francisco	Toronto, Canada	Sao Paulo, Brazil	London, England			

Thor . . . **PORTABLE POWER**
TOOLS

PNEUMATIC TOOLS • UNIVERSAL AND HIGH FREQUENCY TOOLS • MINING AND CONTRACTORS TOOLS

COMPLETELY NEW



MAIL THIS COUPON TODAY

We would like to arrange for an immediate demonstration of the new Thor "200" Stoper.

Name _____

Mine _____

Address _____

City _____ State _____



Perfect Combination for
**LOWER COST
PER MILE!**



Your U. S. Distributor is an expert in tire care. And he's an expert in fitting tires to the job. He'll make sure your trucks are equipped with the right tire and the right size for your particular operation.

Through his U. S. Fleet Service program, he can provide you with preventive maintenance that means plus mileage. For instance, he'll inspect your trucks regularly, replace worn out tires and tubes *before* they cause expensive delays, and recap and repair in time. He'll recommend changes in inflation, loads and speeds for more economical operation.

When you add this kind of service to tough, long-wearing U. S. Royal Con-Trak-Tors, you've got the perfect combination for *lower cost per mile!*

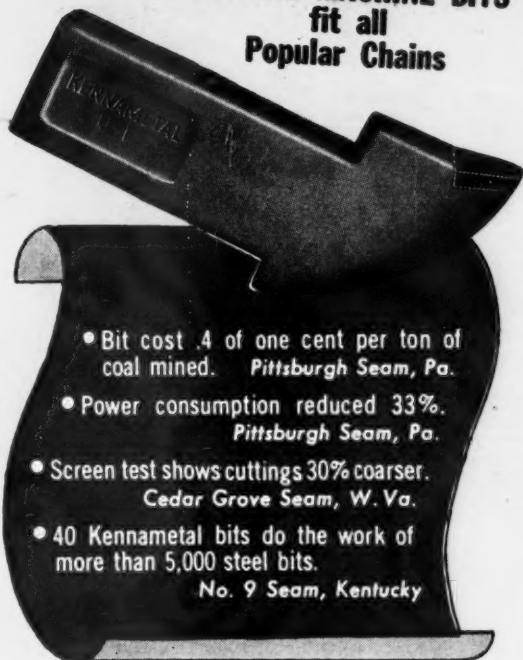
*Call your U. S. Distributor TODAY for
free inspection of your tires. He's listed
in your Classified Telephone Directory.*



UNITED STATES RUBBER COMPANY *Serving Through Science*

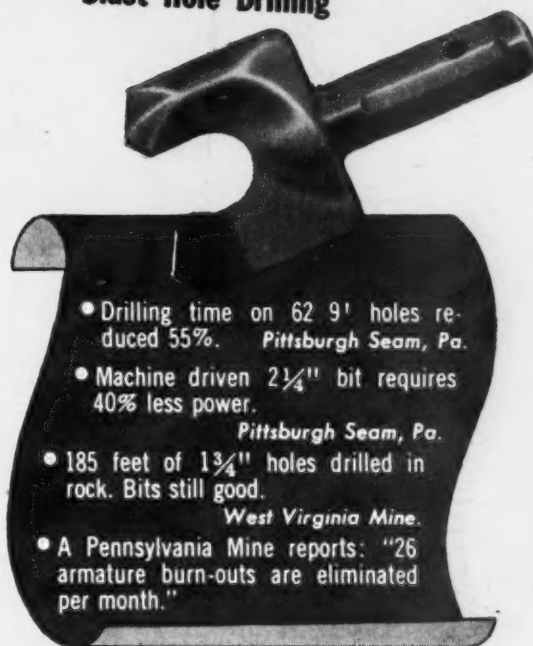
The Records Show— More Profit with Kennametal Bits

CUTTING MACHINE BITS fit all Popular Chains



- Bit cost .4 of one cent per ton of coal mined. *Pittsburgh Seam, Pa.*
- Power consumption reduced 33%. *Pittsburgh Seam, Pa.*
- Screen test shows cuttings 30% coarser. *Cedar Grove Seam, W. Va.*
- 40 Kennametal bits do the work of more than 5,000 steel bits. *No. 9 Seam, Kentucky*

TWO-WAY DRILL BITS for Blast Hole Drilling



- Drilling time on 62 9' holes reduced 55%. *Pittsburgh Seam, Pa.*
- Machine driven 2 1/4" bit requires 40% less power. *Pittsburgh Seam, Pa.*
- 185 feet of 1 3/4" holes drilled in rock. Bits still good. *West Virginia Mine.*
- A Pennsylvania Mine reports: "26 armature burn-outs are eliminated per month."

PNEUMATIC PERCUSSION BITS for Drilling Hard Rock in Overcasts, Roof Jobs, Ribwork etc.



- 119 feet of solid sand rock drilled. No loss in gage. No sign of wear. Rate: 16" per minute.
- Steel drilled 1 1/2" in Barre Granite. Kennametal drilled 50 ft. Gage loss 1/4"
- One bit saves almost \$50.00 in bit cost alone before it dulls. Hard Limestone.
- Two steel bits wore out from drilling 3" in hard pan, while one Kennametal bit drilled 28". Still good for more drilling.

Service records on the toughest jobs in the mine prove the overwhelming superiority of Kennametal cutting machine bits, percussion bits and drill bits. Speeds of cutting and drilling increase, men and machines do less work, bit cost per ton of coal mined goes down, and production goes up. Other Kennametal bits in the line are strip mining bits for drilling 3 1/2" to 6 1/2" holes and core and plug bits for exploratory drilling.

A nearby Kennametal mining representative will be glad to contact you regarding your cutting and drilling problems. Simply write Mining Div., Kennametal Inc., Latrobe, Pa., requesting a call.

Send for our new Catalog M-4 today!

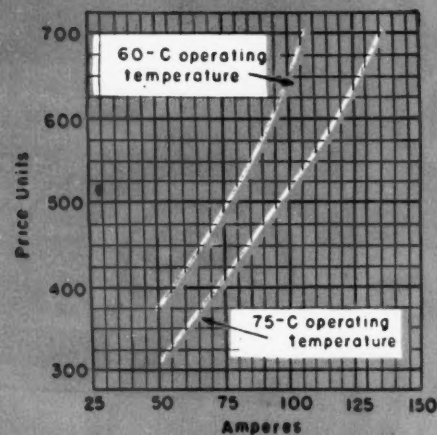
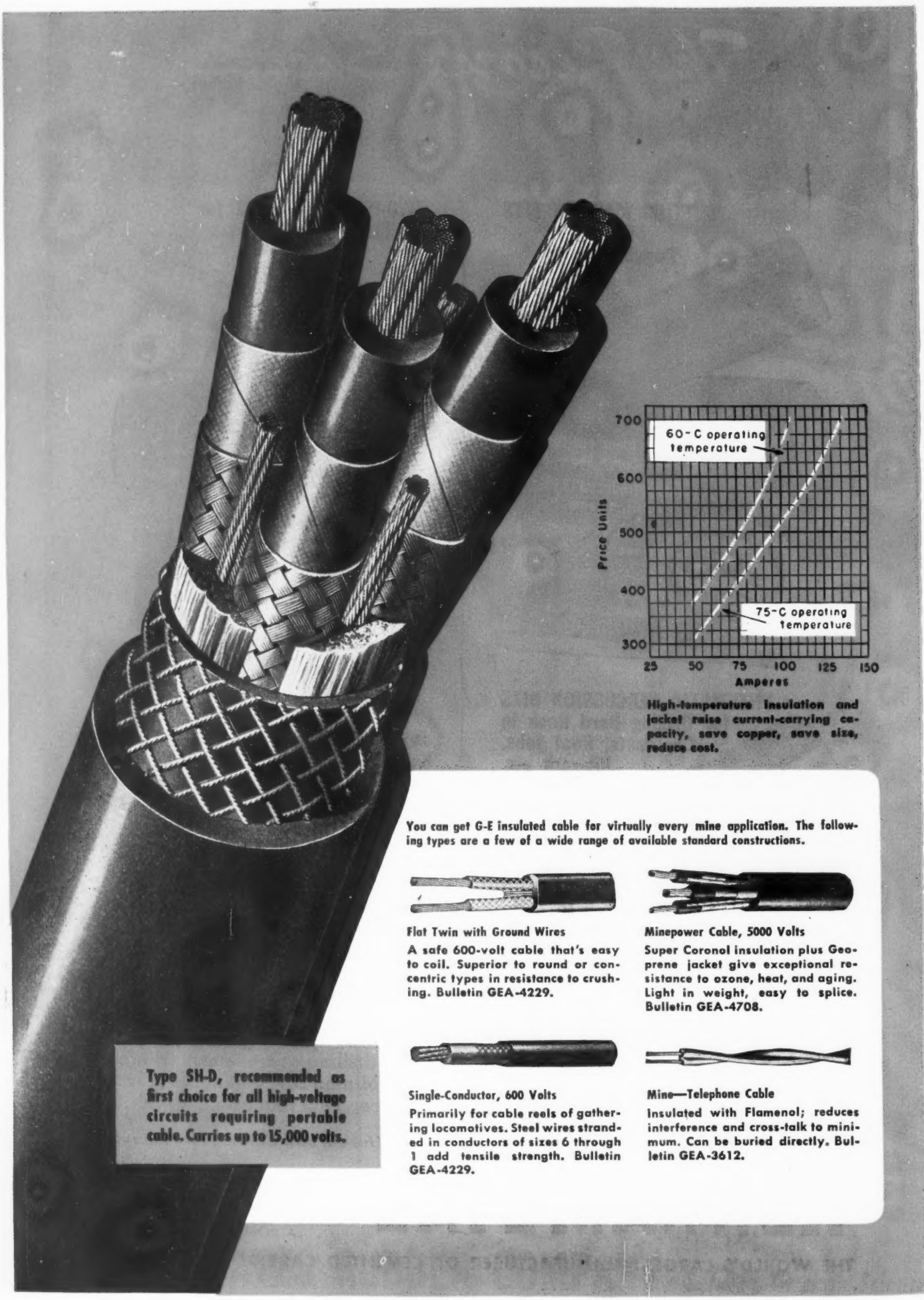
KENNAMETAL

THE WORLD'S LARGEST MANUFACTURER OF CEMENTED CARBIDE MINING TOOLS

MINING DIVISION

KENNAMETAL Inc.,

LATROBE, PA., U.S.A.



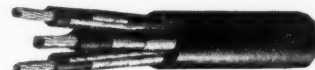
High-temperature insulation and jacket raise current-carrying capacity, save copper, save size, reduce cost.

You can get G-E insulated cable for virtually every mine application. The following types are a few of a wide range of available standard constructions.



Flat Twin with Ground Wires

A safe 600-volt cable that's easy to coil. Superior to round or concentric types in resistance to crushing. Bulletin GEA-4229.



Minepower Cable, 5000 Volts

Super Coronol insulation plus Geoprene jacket give exceptional resistance to ozone, heat, and aging. Light in weight, easy to splice. Bulletin GEA-4708.



Single-Conductor, 600 Volts

Primarily for cable reels of gathering locomotives. Steel wires stranded in conductors of sizes 6 through 1 add tensile strength. Bulletin GEA-4229.



Mine-Telephone Cable

Insulated with Flamenol; reduces interference and cross-talk to minimum. Can be buried directly. Bulletin GEA-3612.

Type SH-D, recommended as first choice for all high-voltage circuits requiring portable cable. Carries up to 15,000 volts.

WHY GEOPRENE PORTABLE CABLE SAVES YOU MONEY

COSTS LESS TO BUY

You save up to 19 per cent when you buy a Geoprene Portable cable. You get a smaller-size cable that costs you less and delivers the same power as a larger one.

The key to this saving is an operating temperature of 75 C instead of the usual 60 C. The higher temperature, permitted by better insulation and jacket, increases current-carrying capacity, saves copper, reduces cost.

The graph, based on 600-volt 2-conductor flat twin cable, shows how 75-C insulation reduces the cable size needed for any given job and permits a first-cost saving of up to 19 per cent.

COSTS LESS TO HANDLE

Geoprene Portable is smaller, takes less space than 60-C cable. It's lighter weight, easier to handle.

You can carry more on a reel. For example, a take-up reel on a mine locomotive holding 300 ft of 60-C cable can take up to 425 ft of 75-C cable.

This saving in weight and bulk is particularly true of the larger sizes. For example, a shovel previously requiring a bulky 4/0-awg conductor size can now be served by a 2/0-awg cable. On a 500-ft length this is a saving of 800 lb or 22 per cent.

COSTS LESS TO MAINTAIN

Your maintenance costs are lower because Geoprene* hits a new high in strength, and in chemical stability. In standard tests its tear strength is two and one-half times as high as Tellurium, our famous prewar natural rubber jacket.

In addition to this remarkable resistance to cutting action and abrasion, typical tests show Geoprene aging properties 2.05 times better than required by industry specs. And Geoprene cables are approved by the state of Pennsylvania for flame resistance.

Geoprene Portable truly offers longer life at a lower price. You can quickly get more details by calling your nearest G-E representative or by writing for Bulletin GEA-4229. *Apparatus Dept., General Electric Company, Schenectady 5, N. Y.*

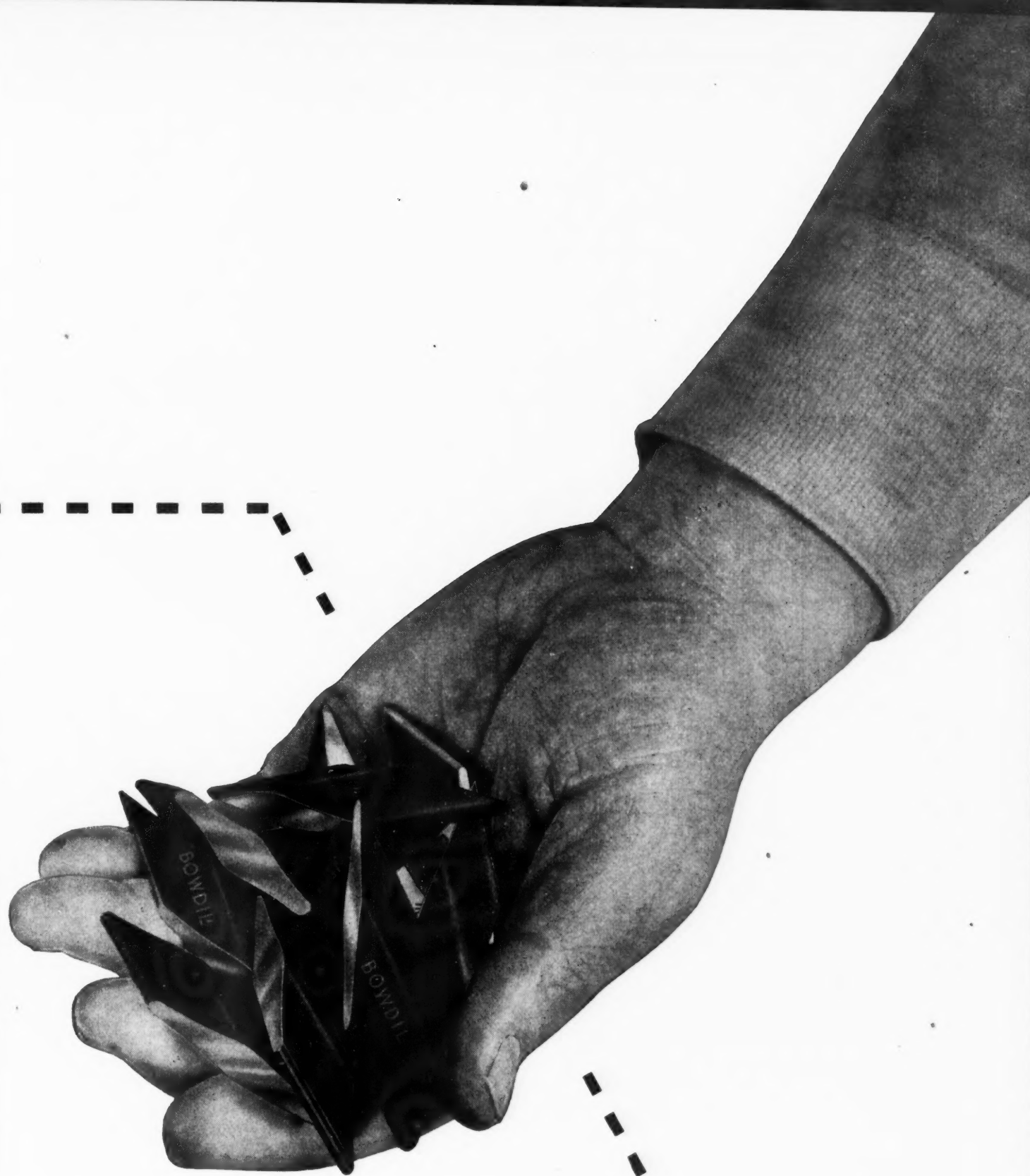
*Geoprene—special G-E compound containing approximately 60 per cent neoprene, with the balance consisting of plasticizers, accelerators, and reinforcing agents.


GENERAL  **ELECTRIC**

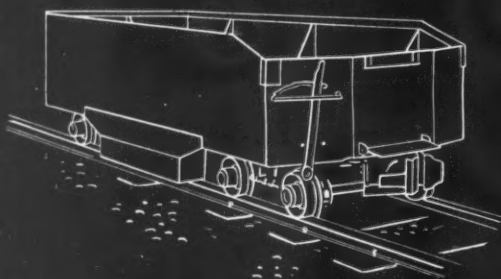
602-74

All in the day's work - - - -

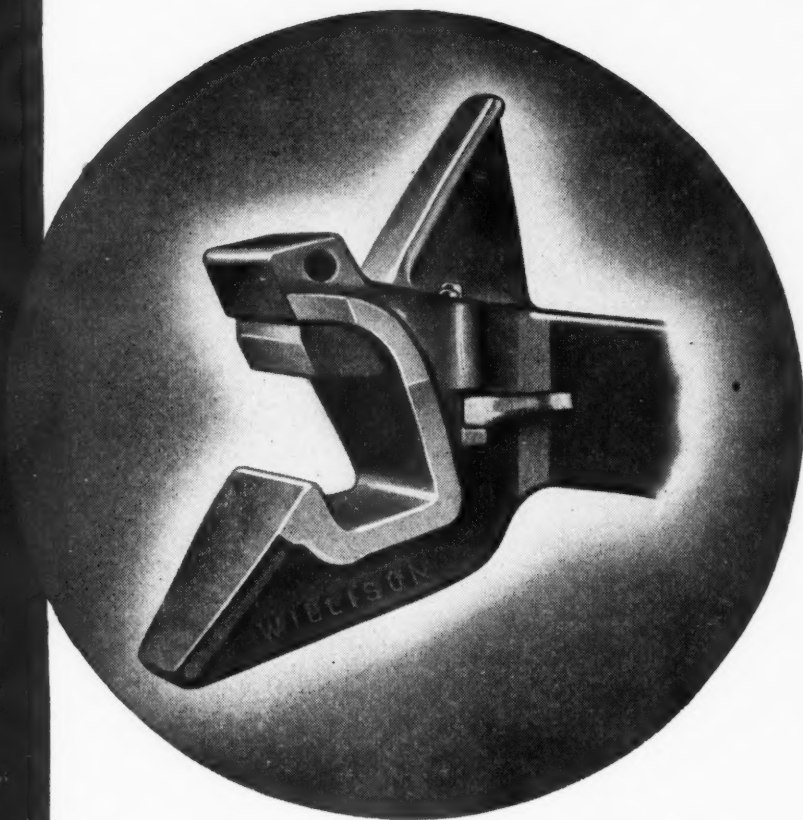
All that's needed in a shift's cutting operation is a pocketful of Bowdil Throw-away Bits per machine. This ease of handling and changing make Bowdil Bits popular with MACHINE operators . . . long life and coarse cuttings at low cost make them popular with MINE operators. And there's no economy in resharpening bits when you get so many tons per point. Write for complete information on all Bowdil Cost-Cutting Coal Cutting Equipment.



BOWDIL 
COAL CUTTING EQUIPMENT
CANTON OHIO



1. Safer operation
coupling and
uncoupling without
going between cars
2. Faster handling
of large cars
3. Faster shunting
and gathering
4. Less spillage
5. No uncoupling
on rotary dumps
6. Hooded type to limit
free vertical
movement, if desired



PROVED

BY LEADING MINE OPERATORS

More and more mine operators are specifying "Willison Automatic Couplers" for their cars, because of these 6 advantages. They've proved that Willison Couplers save time, cut costs . . . and that their strength and durability make them a profitable, long-time investment.

Ask us for details on how Willison Automatic Couplers will pay for themselves, in your mines.



ESTAB. 1868

NATIONAL MALLEABLE AND STEEL CASTINGS COMPANY
CLEVELAND, OHIO

THREE REASONS WHY

Rome 60

Mining Machine Cables

provide

SAFE
operation

Parallel Duplex Mining Machine Cable with Ground Wire. Note the "Appro. No. P-105" molded in the jacket.

1

EXPERIENCE

Rome Cable engineers for years have had intimate experience with problems of mine operations. Its mine specialists are selected for their knowledge of mining . . . their ability to talk and understand mining language. From this "living with the mines" Rome has developed the "know-how" of making superior cables.

2

RESEARCH AND DEVELOPMENT

In a modern and completely equipped laboratory skilled technicians search constantly for better materials and better production methods with which to improve Rome products. A notable result of this technological vigilance is the fact that Rome 60 Mining Machine Cables were flame resistant long before the State of Pennsylvania made this quality a requirement by law.

3

QUALITY CONTROL

Adherence to quality standards is assured by a large and experienced inspection unit which is responsible only to the president of the company. Thus, quality surveillance is independent of production or sales quota pressures. This inspection group has only one job . . . that is to see that you get the best product that Rome Cable can produce.

To be sure, there are other reasons for rugged dependability of Rome 60 cables. Basically, however, they all add up to *unexcelled quality*, because of long experience, sound research and engineering, rigid inspection standards . . . *plus* pride of honest workmanship. These are the reasons why you should specify the Rome 60 Mining Machine Cables.

FROM BAR TO FINISHED WIRE

ROME CABLE
CORPORATION
ROME • NEW YORK

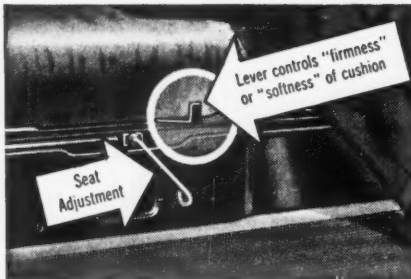


Much That's New...and "Job-Rated," too!



1. More Safety from the All-'Round Vision of New "Pilot-House" Cabs!

Note the tremendously increased vision of new Dodge cabs. Windshields and windows are higher and wider. New rear quarter windows are available, adding still more to vision and to safety. You get true "Pilot-House" vision in all directions. They are the safest cabs ever built.



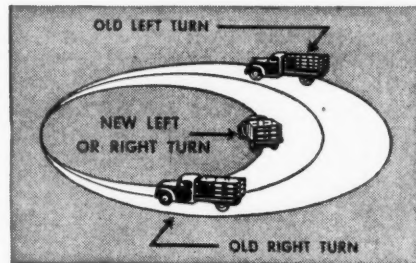
2. More Comfort from New Adjustable "Air-O-Ride" Seats!

"Air-O-Ride" seats give the kind of comfort you want. You may have a "soft" seat . . . or you can ride on a "firm" or "medium" seat. You control cushion "give" by a lever at the bottom of the front seat. Seven full inches of seat adjustment provide the right legroom for every driver.



3. More Safety . . . More Comfort . . . from New All-Weather Ventilation!

Whether the thermometer is ten below or a hundred above—you're comfortable! That's because of the availability of an ingenious combination of fresh air intake, newly designed hot water truck heater, with powerful fan and defroster tubes, vent windows and cowl ventilator.



4. Easier Handling because of New Chassis Design!

By moving the front axle back, under the frame, and moving the engine forward, Dodge has greatly improved maneuverability and weight distribution. Also, a wider front axle tread plus a new type of cross steering permit a full 37° turning angle to left or right.

5. . . And Your New Dodge Truck will be "Job-Rated," too!

Every unit of your truck . . . from engine to rear axle . . . will be "Job-Rated" for economy, dependability, performance, and long life. The 248 basic chassis and body models are engineered and built for gross vehicle weights up to 23,000 lbs., and for gross train weights up to 40,000 lbs.

NEW
DODGE
"Job-Rated"
TRUCKS
FIT THE JOB . . . LAST LONGER



AT Robena

THE WORLD'S
LARGEST COAL MINE-

-Eight Whaley "Automats" Are Speeding Development Work

From the beginning, in 1937, Whaley "Automats" have been rushing development work in the H. C. Frick Coke Company's Robena Mine in Greene County, Pa.

Officially opened in September 1946, this U. S. Steel mine, although nowhere near full production, is already producing an output of 14,000 Tons of coal per day. In each department of this world's largest producing mine, every modern mining practice and the most modern and proved dependable equipment, backed by sound engineering and business experience, are being utilized.

We are indeed proud of the part our loaders are playing in this technically and mechanically perfect operation. Back of the "Automat's" efficient service in this mine is a reputation for dependable

service and features in operation that only the "Automat" can render. Only the "Automat" can give you a vertical lift shovel action loading head. Only the "Automat" can give you the automatic parallel-lift rear conveyor for maximum loading in limited head room. Only the "Automat" gives you an average loading rate of 3 tons per minute with only one 25 H. P. Motor. And, because of the "Automat's" exclusive vertical lift shovel action, it's always a safe machine in the closest places.

The photograph above shows one of the "Automats" at the Robena mine starting a cross cut. Note the heavily loaded front conveyor and also the parallel-to-car rear conveyor.

MYERS-WHALEY COMPANY, KNOXVILLE, TENNESSEE

Myers-Whaley

Remember, the "Automat" loads, in its stride, any lump of coal that will pass through your tipple, or any lump of rock your cars, aerial tram or larries, can take.

MECHANICAL LOADERS EXCLUSIVELY FOR OVER 40 YEARS

He Is Dead...But Has "A Way Out"

FAMOUS PATENTS

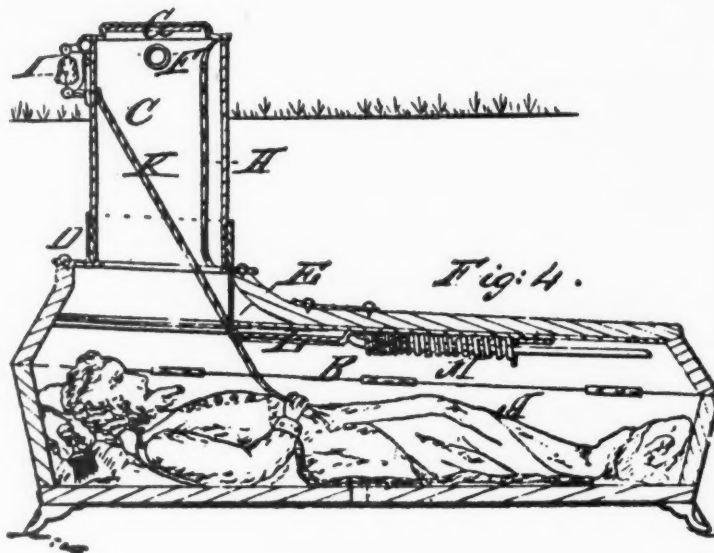
THIS IS No. 10

IMPROVED BURIAL CASE

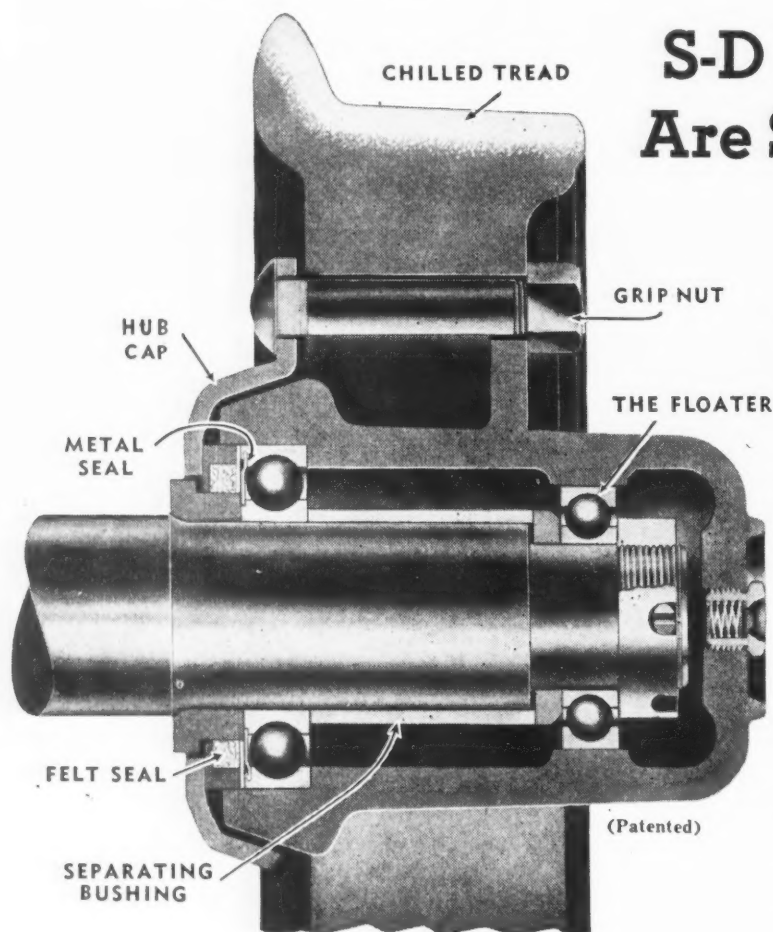
U. S. PATENT NO. 81,437 — AUGUST 25, 1868

"... The nature of this invention consists in placing on the lid of the coffin, and directly over the face of the body laid therein, a square tube, which extends from the coffin up and through and over the surface of the grave, said tube containing a ladder and a cord, one end of said cord being placed in the hand of the person laid in the coffin, and the other end of said cord being attached to a bell on the top of the square tube, so that, should a person be interred ere life is extinct, he can, on recovery to consciousness, ascend from the grave and the coffin by the ladder; or, if not able to ascend by said ladder, ring the bell..."

(Language inside of quote marks taken directly from U. S. Patent.)



S-D "Floater" Wheels Are Surely Live Babies



First . . . S-D Ball Bearing "Floaters" increase haulage capacity of locomotive on ordinary mine tracks approximately 50 per cent as compared to cars with other types of anti-friction bearings.

Second . . . They speed up haulage approximately 10 per cent.

Third . . . They require lubrication only once in 5 to 10 years.

Fourth . . . They are demountable like automobile wheels.

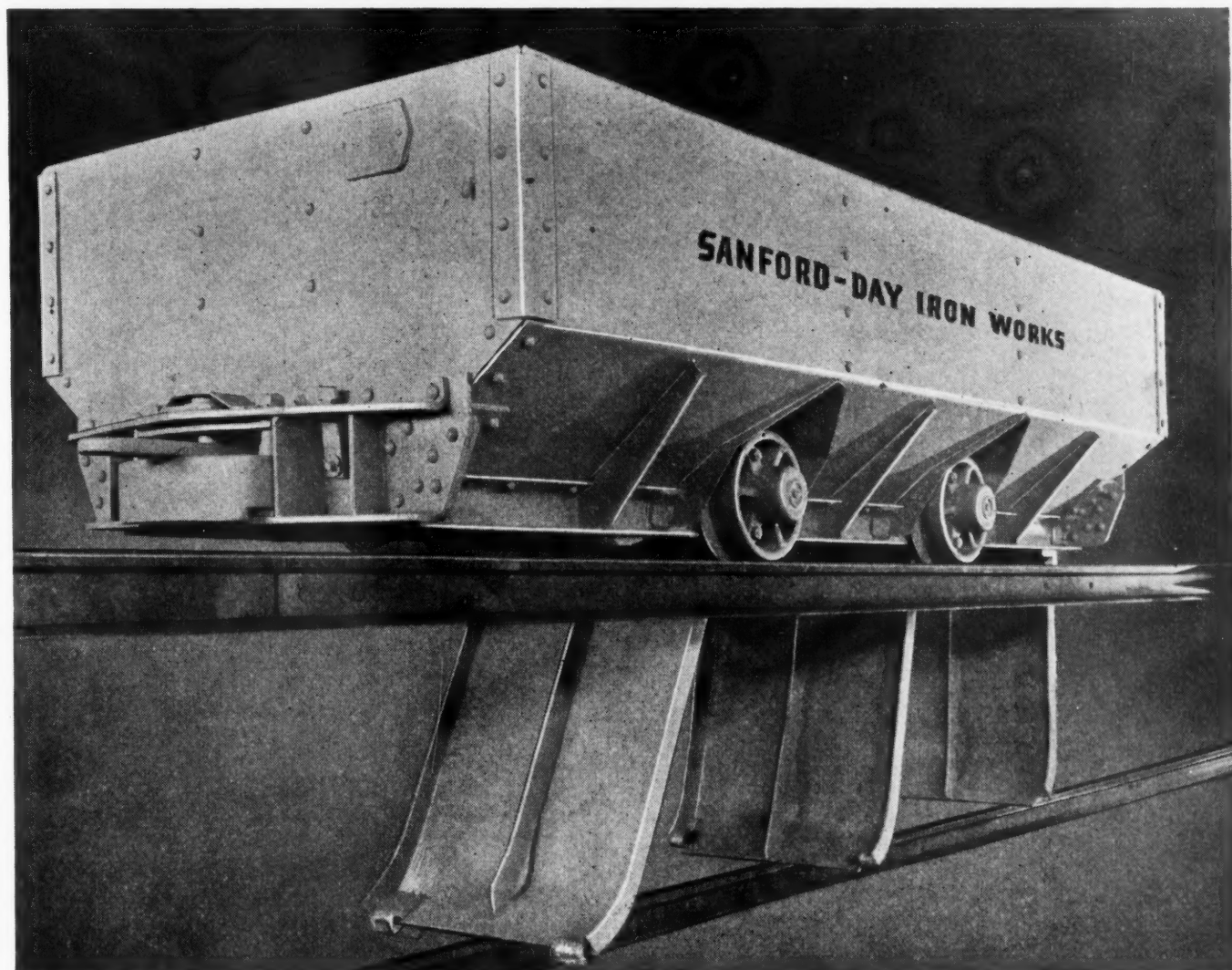
Fifth . . . Both the castings and ball bearings are guaranteed for 5 years.

Why not install S-D "Floaters" on your old cars? Why not bring them to life in-so-far as haulage is concerned—at least.

20 Car loads of "Automatics" from -

SANFORD-DAY IRON WORKS, Inc. • Knoxville 9, Tenn.

For Mine Operators, The Use of S-D Automatics Is "The Big Way Out"



Obsolete mine cars reduce production. They increase maintenance cost. They greatly increase labor costs. Profits are greatly reduced by using them. To build up profits use S-D Automatics. Innumerable coal operators have discovered the truth of this statement.

S-D Automatics can be supplied with tonnage capacities to suit requirements. In the average, they last 15 to 20 years. They have extremely large capacity for equal overall dimensions. They are not wracked by end or rotary dumping. Fifty tons or more of coal can be discharged into the storage bin per minute—automatically and without labor.

The coal is laid down gently in the bin, thus reducing greatly the breakage of lumps.

S-D Automatics are now equipped with an unlatching device that operates from underneath the car. The old sidewise extending latch-lever bar that gave trouble at times is no longer used.

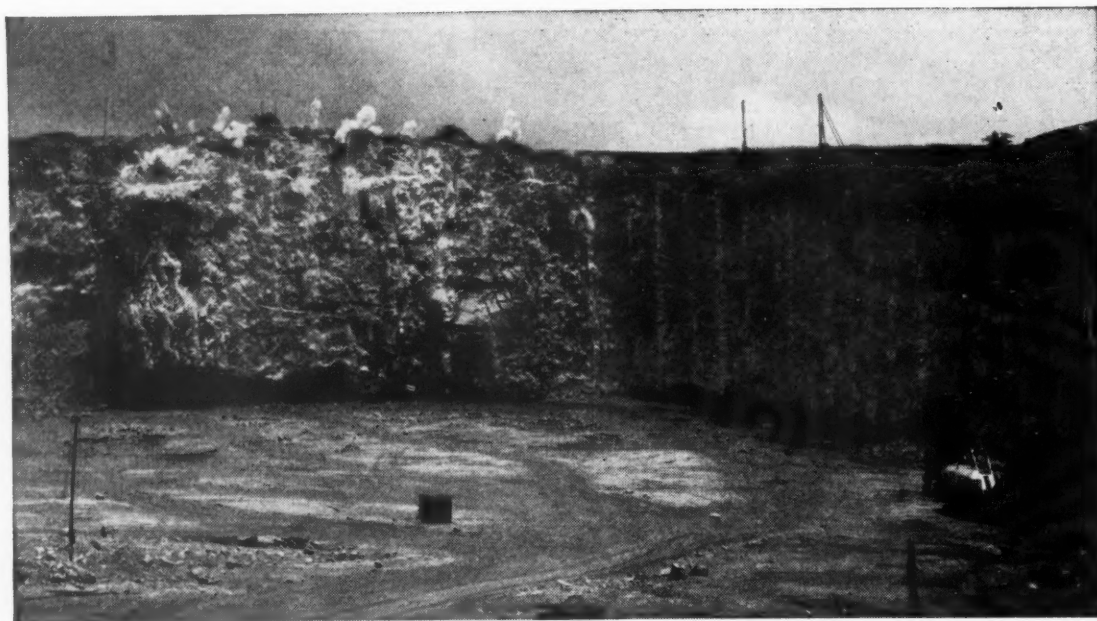
If any operator feels that he cannot afford to buy S-D Automatics on a cash basis, we will be very glad to lease them. The rental rate per ton of coal handled during a period of 15 years will probably average less than 3 cents per ton. Today, a very large percentage of our Automatics are being leased. The operators like to lease them. Write, wire or telephone us for full particulars.

20 Car loads of "Automatics" from -



SANFORD-DAY IRON WORKS, Inc. • Knoxville 9, Tenn.

Can **ROCKMASTER** Lower Your Costs By More Efficient Use of Blasting Power?



Waste gas means waste power . . . notice the almost complete lack of it in this photo, even though the face has moved out.


This photograph tells more graphically than words why the Rockmaster Blasting System has been able to save as much as \$20,000 a year in drilling and blasting costs in certain quarries . . . why it cuts costs way down on construction jobs and in coal stripping pits.

Rockmaster is the original milli-second delay blasting system . . . pioneered by Atlas. The choice of explosive velocity, detonators, spacing, loading and timing are all considered for your individual requirements.

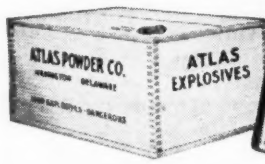
That is why Rockmaster gives you better fragmentation and far less "back-break" in quarries and less pulverizing of coal in strip pits. That's why there's less noise and vibration, even though more holes may be fired.

*Call in the Atlas representative today.
Let him tell you what Rockmaster
can do under your own conditions.*

**ROCKMASTER GIVES
YOU THE GREATER
SAFETY OF MANASITE
DETONATORS**



**Less Bark . . .
More Bite**

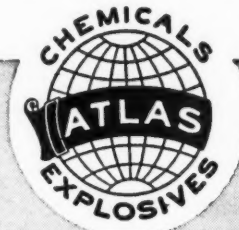


"ROCKMASTER"—Trade Mark
Manasite: Reg. U. S. Pat. Off.

ATLAS

EXPLOSIVES

"Everything for Blasting"



ATLAS POWDER COMPANY, Wilmington 99, Del. • Offices in principal cities • Cable Address—Atpowco

IT'S "CATERPILLAR"
WHEN THE GOING
IS TOUGHEST



THE Standard Gravel and Surfacing Company's strip-mining operation at Grassy Lake, Alberta, is one of Canada's largest. And the tough power assignments here, as in many other parts of the world, go to "Caterpillar" Diesel equipment.

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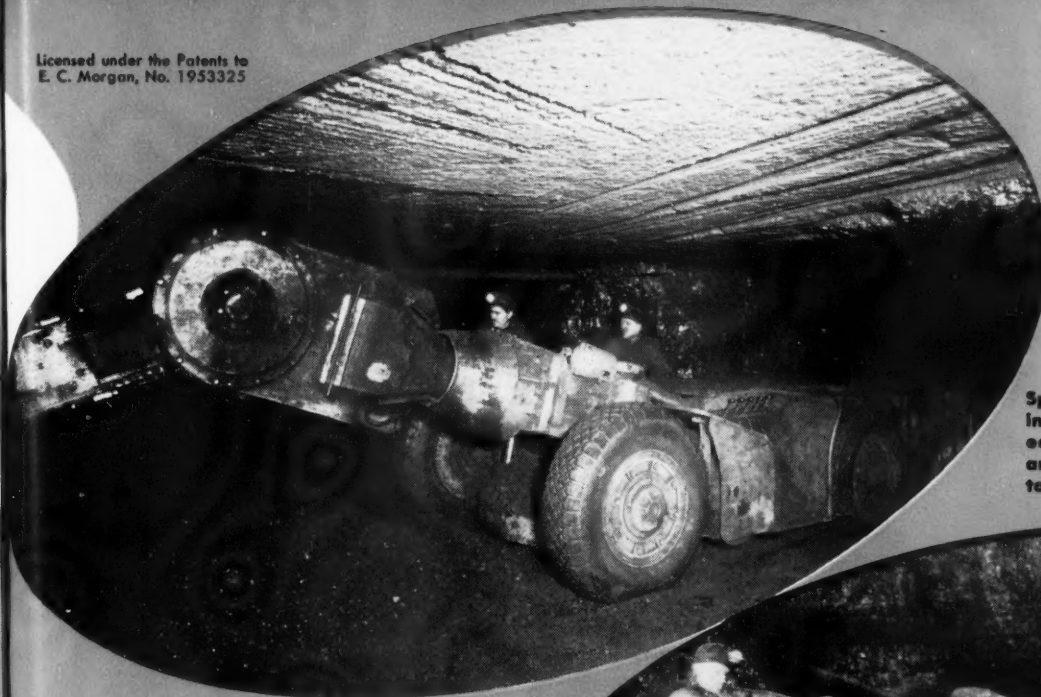
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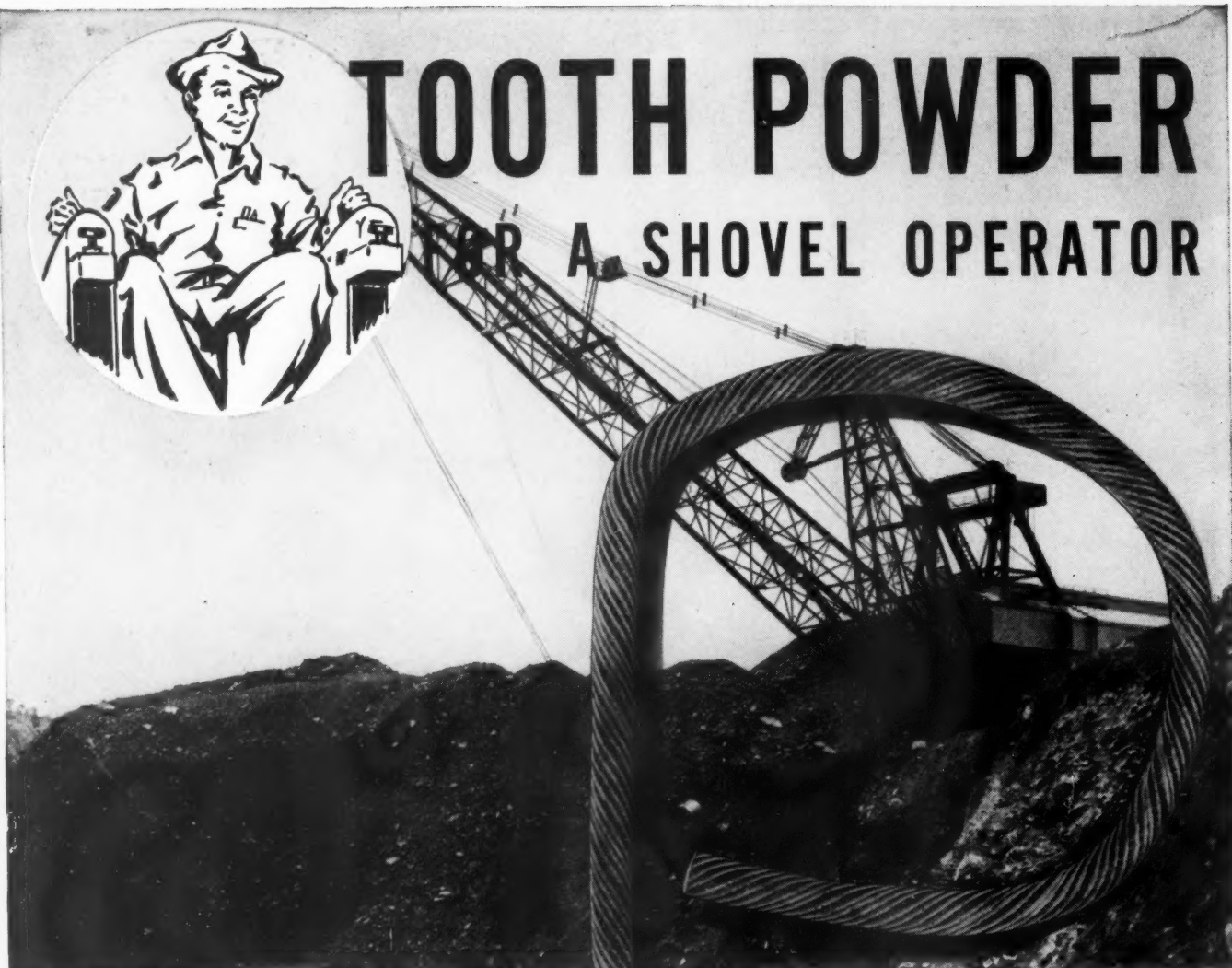
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FEBRUARY, 1948

IVAN A. GIVEN, EDITOR

Still Better Than Fair

ALL IN ALL, coal men in the United States—owners, managers and men, along with the many organizations supplying the industry's requirements for better equipment and materials—can look back at 1947 with satisfaction and ahead to the future with optimism. Coal was able to meet all demands laid on it by United States users in 1947 and still provide a substantial tonnage for the relief of stricken countries overseas. Few, if any, other industries can make a similar statement, and the results of 1947 effectively vindicate the faith in the future of the industry that kept coal men in there pitching in the dark days of the late 20's and early 30's.

A look at the future provides grounds for equal satisfaction, although only the foolish would go so far as to say that the industry had worked its way out of all its difficulties. While some of the rosiness is a result of heavy sledding in competitive industries, a lot is the direct result of coal's own efforts. In other words, the mounting pressure for higher efficiency, higher quality and better service to the consumer is beginning to bear fruit in improved consumer and public regard. Coal still has some distance to go, but events in 1947 proved once again that it has the will, as well as the ability, to move ahead at an even faster pace.

But, to repeat, while the road ahead should be smoother, it still cannot be described as free from rough spots. Oil and gas competition, while somewhat set back for the time being, cannot be counted out completely, especially if it can hold the margin in public esteem it has built up in recent years, while the President's State of the Union message of Jan. 7 served notice that the New Deal still intends, if possible, to broaden the government's competitive power, in addition to its general goal of attaining greater control over the economy of the country. Finally, among other

things, coal still has the problem of achieving relations with its workers that will minimize strikes and controversies and thereby eliminate a major cause of adverse public reaction.

Coal's counteroffensive, while still deficient in some respects, gathered momentum in 1947, however. There was no slackening, for example, in the installation of new equipment for raising efficiency, keeping down cost and boosting quality, and programs were being set up to assure early development and use of new machines offering even greater benefits. Additional strides were made in making coal mining safer and more attractive. While employee relations remained somewhat unstable, the year witnessed an increase in work directed at bringing the miner and his company into closer harmony, with, all the evidence indicates, some degree of success. Intensified public relations also paid off to an increasing degree, along with an increase in research and new and more comprehensive marketing and consumer-relations programs.

Summing up, coal can take credit for notable progress in discharging its obligations to its investors, its employees, its customers and the public at large in 1947. Even more, it strengthened the foundation for future progress through investments in production plant and equipment, through better safety measures, through enhanced research and development of new processes and equipment for coal utilization, through intensified public relations and through better merchandising. Stresses and strains undoubtedly will be encountered in the days to come. But the achievements of 1947 and the additional advances that undoubtedly will highlight the future will make it easier to meet and solve any problems that may be encountered, further solidifying coal's dominant position in the fuel and energy markets.



MINERS' WAGES reached an all-time high for industrial workers as new contracts granted bigger benefits in both industries.

1947: Big Year for Coal

Production Near the All-Time High, Plus Intensified Efforts on the Production and Merchandising Fronts, Enable Coal to Meet All Demands With Margin for Export—Brighter Future Reflects Increased Competitive Power

THE BITUMINOUS INDUSTRY, hoisting itself by its own bootstraps over some tough obstacles, broke all peacetime production records with an estimated output of 619,000,000 tons in 1947, up 16 percent above last year's tonnage and enough to meet surging industrial

and domestic needs with a margin of some 46,000,000 tons left for export and additions to stocks. Overall Lake dumpings are estimated at 52,300,00 tons, a record second only to the 55,491,000 tons dumped in 1944. Anthracite output totaled about 57,000,000 tons, a little over

6 percent less than the 60,507,000 tons produced in 1946.

On the whole, coal-company earnings were a little better than in 1946, largely because of increasing efficiency reflected in higher productivity per man in bituminous and anthracite, more machinery, better planning and less idle time. Average value of bituminous at the mine rose from \$3.44 in 1946 to an estimated \$4 in 1947; anthracite, from \$6.83 to an estimated \$7.54.

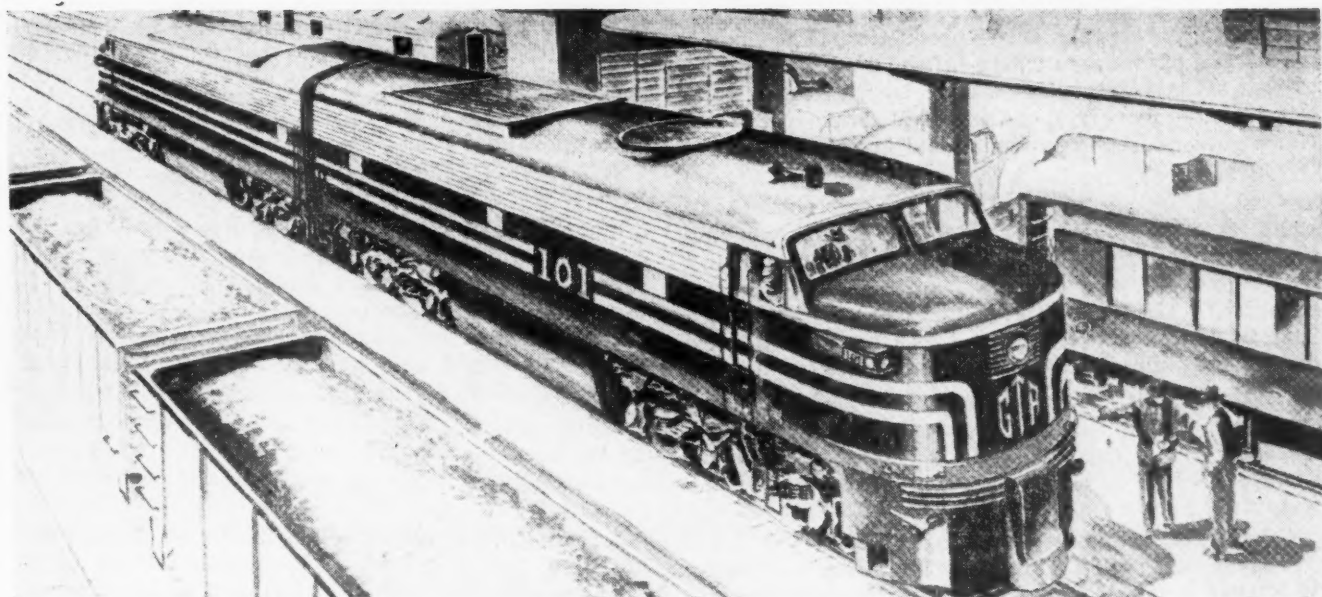
On the favorable side, enabling bituminous to move upward, were government withdrawal from control of the mines in June after 13 months of seizure, an increase in men employed from 396,434 to about 407,000, the opening of about 225 good-sized new deep and strip mines with a capacity of about 165,000 tons daily and, with the new contract, an apparent willingness on the part of mine workers to pull together with management for high-level output. Not to be overlooked in the bituminous picture was a high level of strip-mining output. Strip mining also figured prominently in the anthracite picture but a degree-day deficiency in the spring coupled with increasing oil competition slowed down both open-cut and deep-mine production.

On the unfavorable side, barriers to higher production included: (1) a nation-wide shortage of railroad cars that idled some hard-hit mines as much as three and four days a week; (2) grumbling by miners at

Coal and Competition — 1946-1947

	1946	1947	Percent Change
Bituminous, tons	533,922,068	619,000,000	+ 16.0
Anthracite, tons	60,507,000	57,000,000	- 6.1
Crude oil, bbl.	1,733,424,000	1,855,000,000	+ 7.0
Sales & shipments			
Natural gas, M.c.f.	2,194,947,500	2,503,637,000	+ 14.1
Mfg. & mixed gas, M.c.f.	553,889,100	615,519,000	+ 11.2
Stokers, Classes I & II.	181,223	64,000	- 64.7
Residential, residential-boiler and residential-furnace oil-burner units.....	499,009	1,306,000	+161.7
Railroad fuel			
Coal, tons	110,406,466	111,000,000	+ 0.5
Liquid fuel, bbl.	112,884,386	116,500,000	+ 3.1
Electric utility fuel			
Coal, tons	68,741,939	88,000,000	+ 28.1
Oil, bbl.	36,241,472	50,640,000	+ 39.7
Gas, M.c.f.	306,924,940	367,000,000	+ 19.5

Figures for 1947 preliminary or estimates. Sources include: U. S. Bureau of Mines, American Petroleum Institute, American Gas Association, Department of Commerce, Interstate Commerce Commission and Federal Power Commission.



COAL-FIRED GAS-TURBINE locomotive reached pilot-plant stage in 1947 and road tests were planned before the end of 1948.

the Supreme Court's ruling against Lewis and the union early in the year; (3) the week-long shutdown in April to mourn the death of 111 miners in the Centralia explosion and the slow return to full-scale operation after Secretary of the Interior Krug closed 518 mines; (4) the surge of absenteeism following passage of the Taft-Hartley Act; and (5) reduction of the work day and the work week under the new contract. That the industry cleared these barriers and set a new peacetime record is a good measure of its industrial muscle.

On the government-relations front, the bituminous year was marked by the end, on June 30, of federal seizure. This, together with the death of SFAW at midyear, left the industry—its owners, management and men—free to solve most of its problems without government meddling. Earlier, on April 3, following the Centralia disaster, Secretary Krug had closed 518 mines until they could be certified as safe, and Admiral Joel A. Boone, on April 13, had released a report on medical and sanitary facilities in the nation's coal-mining towns, based on an eight months' survey under direction of the Coal Mines Administration. The Boone report, while finding much to condemn, also found much that the industry can be proud of. Some 50 recommendations for action by management, men, the union and state and federal agencies to improve over-all conditions wound up the report.

As Congress prepared for adjournment early in August, President Truman signed his approval

on a new mine-inspection law calling for prompt report of unsafe conditions by the government to mines and state agencies concerned and for a quarterly report to Congress by the Secretary of the Interior of all inspections, recommendations and actions for better safety.

Miners Gain in New Contract

On the labor-relations front, the Supreme Court's rebuke of John L. Lewis, passage of the Taft-Hartley Act over the President's veto and the new contract in July made the big news. On Jan. 14, the Supreme Court opened hearings on the appeal by the union and Lewis from the findings and fines of District Judge Goldsborough. In its ruling on March 6, the court ordered Lewis to comply with the rulings of the lower court and upheld Judge Goldsborough's citation for contempt of court, reducing the fine against the union from \$3,500,000 to \$700,000 but confirming Lewis' fine of \$10,000. Shortly after the decision, Lewis withdrew his strike notice of Nov. 15, 1946, and ordered his miners to continue work.

On June 23, after several months of hearings and passage by both houses, Congress mustered the necessary two-thirds majority and overrode the President's veto of the Taft-Hartley bill. The new law restored some of management's rights and, though greeted with scattered walkouts by disgruntled miners, gave promise of long-range improvement in labor relations.

Passage of the Taft-Hartley Act, together with the end of seizure,

cleared the air for negotiation of a new bituminous contract in private talks between Lewis and officials of the U. S. Steel Corp. and the Pittsburgh Consolidation Coal Co. After announcement of a new wage agreement by these two companies and the union on July 8, at the end of the miners' 10-day vacation, other operators quickly fell in line.

The new contract granted virtually all the demands that had wrecked previous wage conferences in May and June and had split northern and southern operators. Concessions boosted the basic day rate from \$11.85 to \$13.05, reduced the work day from 9 to 8 hours with a 30-minute lunch period, doubled the welfare levy to 10c. a ton, wrote the Federal Mine Safety Code into the contract, ordered compliance of operators with state workmen's compensation laws, exempted certain classified employees who perform management functions, continued the \$100 annual vacation payment and stipulated that the contract should be effective at such times as miners are "able and willing" to work.

Much the same contract, with a \$1.20 increase for inside and outside men, was signed July 10 by the anthracite industry. Shortly afterward, in September, the 77,000 anthracite miners received letters from top union officials urging higher productivity as a guarantee of stability in the industry and full employment for miners.

That this was, by far, the most favorable contract the miners had ever won was made clear in the Bureau of Labor Statistics report that in September bituminous

Coal Around the World

Here, *Coal Age* summarizes production, employment, import and export data where information is available, as well as data on prospects and plans. The material was gathered by correspondents of McGraw-Hill World News. All figures are rounded and in net tons.

Australia—Estimated output, 16,580,000 tons against 14,600,000 tons in 1946. Imports confined to small quantities of anthracite for carbide production; exports largely bunker fuel. New South Wales, major producing area, employed 16,500 men, compared with 17,100 in 1942. Plans for 1948 include a 200,000-ton development in Queensland, new brown-coal stripping in Victoria and more training.

Belgium—Output estimated at 27,000,000 tons, compared with 26,400,000 tons in 1946. Imports, 5,335,000 tons; exports, 1,210,000 tons. Manpower down 6,000 to 133,000, due to removal of POW's, who were only partly replaced by DP's.

Canada—Estimated production, 16,000,000 tons, compared with 17,811,744 tons in 1946. Imports, 34,000,000 tons, all from U. S.; exports, 680,000 tons, all to U. S. Employment, 23,000. Supply was adequate.

China—Production at lowest level in 36 years, with only 9,350,000 tons estimated in non-Communist areas in first half of the year, including Manchuria and Formosa. Fighting in North China and Manchuria expected to push second-half figure lower. Communist destruction of mines and railways makes outlook for 1948 very dim.

Czechoslovakia—Production in 1947: black coal, 17,900,000 tons against 15,503,000 tons in 1946; brown coal, 24,700,000 tons against 19,800,000 tons in 1946. Exports, 940,000 tons; imports, 743,600 tons. Employment about 90,000. Man-day output, 1.19 tons.

France—Estimated production of 52,250,000 tons slightly below 1946, chiefly because of three-week Communist-led strike near end of the year. Imports of 18,000,000 tons, mostly from U. S., brought total supplies to within 10 percent of prewar. Exports less than 500,000 tons. Employment, 224,000 pit workers, including 24,000 POW's, plus 100,000 surface workers. Mechanization, especially in Lorraine mines, was pushed by arrival of most American equipment ordered.

Germany—Excluding Silesian fields east of Oder-Neisse line, estimated output of black coal was 94,900,000 tons against 72,265,000 tons in 1946; brown coal, 174,000,000 against 175,800,000 in 1946. Russian dismantling of Soviet-zone mines accounted for drop in brown-coal output. Exports totaled 13,200,000 tons, compared to 14,740,000 tons in 1946. Drop in exports came in last half of the year, when minimum German requirements were threatened. Employment in black-coal mines, about 368,000, including 281,000 underground workers. In vital Ruhr mines, manpower rose from 209,543 at end of 1946 to over 301,000, but absenteeism remained high.

Great Britain—Estimated output: deep-mined, 209,082,000 tons; strip-mined, 11,558,000 tons. Total was nearly 9,000,000 tons above 1946 and only 300,000 tons below goal for the year. Manpower up from 692,600 in Dec., 1946, to about 719,000, but recruiting slowed down at year's end. Man-day production held at about 1.2 tons. Five-day week, begun in May, was supplemented by voluntary overtime begun in October. Imports estimated at 780,000 tons, 22,000 tons monthly from Poland since July and remainder from

U. S. Exports estimated at 987,000 tons, plus 500,000 tons of bunker fuel. Production goal for 1948 is 236,300,000 tons, with 11,000,000 tons for export. Year-end supplies permitted near doubling of exports to 224,000 tons weekly.

Hungary—Under nationalization, effective Jan. 1, 1947, total output estimated at 8,250,000 tons of brown coal and 1,100,000 tons of black coal, against 6,193,000 and 792,000 tons respectively in 1946. Brown-coal exports were 211,750 tons, mostly to Yugoslavia and Austria, about 9,000 tons over 1946. Black-coal imports totaled 220,000 tons, mostly from Poland, Czechoslovakia and U. S. S. R. Manpower numbered about 49,800.

India—Output, 33,600,000 tons, against similar figure in 1946. Employment, 210,000. Production hampered by antiquated methods and shortage of rail transport.

Japan—Output estimated at 29,700,000 tons, some 3,300,000 tons short of goal essential for recovery. Imports, all from Sakhalin, totaled 48,000 tons of coking and semi-coking coal. Exports were 864,000 tons, 725,000 tons going to Korea and remainder to Hong Kong. Manpower up to 450,866 in December from 361,018 in January. Nationalization issue ended in compromise, with operators, labor and government forming a state-control enterprise.

Netherlands—Imports supplementing home production kept supplies adequate. Output estimated at 11,000,000 tons, against 9,130,000 tons in 1946. Imports, 4,180,000 tons, against 3,500,000 in 1946; exports, 550,000 tons, all of which was coke, against 440,000 tons in 1946. Employment up 1,000 over 1946 to 41,000, 24,000 of whom were underground workers.

New Zealand—Estimated output of 3,110,000 tons, about the same as 1946. Government railways imported 102,000 tons from U. S., compared with 30,500 tons in 1946. Manpower averaged 5,271 against 5,557 in 1946. Labor government is nationalizing all mines piecemeal and is expected to finish in 1948.

Poland—Estimated production, 64,000,000 tons, of which nearly 20,000,000 tons was exported. Goal for 1948 is 75,000,000 tons, including 27,500,000 tons for export. On July 1, 1947, manpower numbered 192,000. Miner recruitment reported to be no problem and miner morale high.

Russia—Data on actual production not available. Eastern fields ended the year with output 60 percent above 1940 and plans for further expansion. Donbas mines approached prewar levels, with major field, Rostovugol, pledged to top prewar by 53 percent in 1948. Nation-wide, Soviet miners pledged to complete five-year plan in four years, boosting output 51 percent over prewar and reaching annual production of 275,000,000 tons by 1949.

Spain—Drop in output from 13,225,000 tons in 1946 to 13,000,000 tons in 1947 attributed to transportation shortage. Imports from Great Britain were cut short but small quantities were exported to Portugal. Mines employ about 85,000 men. A government commission rations output but mines still are in hands of private owners.

Union of South Africa—Estimated production, 28,290,000 tons, compared with 28,710,000 tons in 1946. Annual output prior to war was about 20,150,000 tons. Goal for 1949 is 33,720,000 tons. Big new plants are building to produce oil and gasoline from coal.

miners earned an average of \$71.19 weekly for 39.1 hours of work, exceeding any previous average among all industrial workers. Anthracite miners followed close behind with \$67.37 for 38.2 hours, a new high for them.

After the Taft-Hartley Act expressly relieved management of compulsion to bargain with foremen's unions, the way was open for coal operators to extend their efforts toward making foremen an even more integral part of management. Training programs and conferences for foremen marked the trend in parts of Ohio. In southern West Virginia, management clubs, most of them affiliated with the National Association of Foremen, drew strong backing and participation by top management. In central Pennsylvania, some 15 companies sent foremen, along with miners, to a six-weeks summer school at St. Francis College, the first stage of a planned three-summer course. At least one company in the anthracite field increased benefits for its supervisory force under company participation group insurance and stepped up the pace of its monthly supervisory conferences.

The pace of miner training also quickened, as did pre-job training for high-school youngsters. In Pennsylvania, for example, the number of boys enrolled in high-school mining courses increased 13 percent over 1946 and in Kentucky the enrollment jumped 43 percent. New classes in vocational schools and high schools opened up in Ohio and West Virginia for miners as well as boys. In September, Pennsylvania State College began a coal-mining class in the Wyoming High School, the first step in a projected three-year course offered free to all men in the mining industry, and the Y. M. C. A. in Wilkes-Barre opened its mining class for the 41st year. More training, higher wages, better living and working conditions and an improving public opinion of coal drew more first-rate young men into the industry and accounted at least in part for the increase in manpower.

The outlook for safety brightened during the year, in spite of a few disasters that made headline news. Aside from inclusion of the Federal Mine Safety Code in the new contract, assuring more uniformity in safety requirements among the nation's coal mines, there was a growing determination among operators and in the mine workers' union to improve the record. In the Beckley, W. Va., area,

1947 Coal Highlights

Jan. 1—ICC boosts freight rates average of 17.6 percent; special increases set for coal.

Jan. 21—Coal ignited at Gorgas mine, Alabama Power Co., in first underground gasification experiment in U. S.

Jan. 22—Pennsylvania R.R. orders 25 main-line diesels.

Feb. 7—Two chassis for first coal-burning gas-turbine locomotives ordered by B.C.R.

Feb. 14—WAA accepts \$143,127,000 cash bid for Big and Little Inch pipelines to bring gas eastward from Texas.

Feb. 18—U. S. Bureau of Mines announces success of underground gasification at Gorgas, Ala.

Mar. 7—Dr. James Boyd named director, U. S. Bureau of Mines; Senate confirmation postponed when Lewis announces opposition.

Mar. 19—Lewis cancels strike notice of Nov. 15, 1946.

Mar. 25—Centralia explosion kills 111 miners. Lewis orders 6-day mourning period. Apr. 1-6. Pittsburgh Consolidation Coal Co. and Standard Oil Development Co. report plans for a \$1,000,000 pilot plant to make gasoline, oil and fuel gas from coal. On Dec. 24, it was announced that construction would start early in 1948.

Apr. 3—Secretary Krug closes as unsafe 518 bituminous mines pending safety certifications.

Apr. 17—Boone report released on medical and sanitary conditions in mining towns.

Apr. 24—B.C.R. announces plans for research to cut mining costs, including development of mining and loading machines.

Apr. 29—Wage negotiations begin at invitation of CMA.

May 6—Wage talks recessed; Southern operators ask for separate talks.

May 16—Lewis renews negotiations with northern, western and "captive" operators.

May 29—Southern operators meet Lewis in contract talks.

May 31—Conferences between U.M.W.A. and northern, western and "captive" operators break down.

June 3—Anthracite Institute opens first of a series of retail-dealer merchandising schools.

June 7—Southern wage conference ends when miners' representatives fail to appear for three days.

June 15—Wage talks begin between U.M.W.A. and officials of U. S. Steel

Corp. and Pittsburgh Consolidation Coal Co.

June 23—Congress writes Taft-Hartley bill into law over President's veto. Many miners walk out in protest.

June 27—Miners begin 10-day vacation ordered by CMA.

June 30—Government operation of bituminous mines ends after 13 months of seizure. SFAW dies by executive order.

July 8—New bituminous wage contract ups basic day rate from \$11.85 to \$13.05; cuts work day to eight hours, work week to five days doubles welfare levy to 10c.; agreement to be effective when miners are "able and willing" to work.

July 10—Anthracite wage contract adjusted in line with bituminous agreement.

July 15—Anthracite, bituminous and coke operators meet to map joint research projects.

Aug. 4—President Truman signs new mine inspection bill into law.

Aug. 30—Bituminous miners' earnings outstrip all records for industrial workers with \$71.49 weekly; anthracite close behind with \$66.26.

Sept. 1—Pennsylvania Anthracite Standards Law becomes effective.

Sept. 22—U.M.W.A. urges anthracite miners to boost productivity.

Sept. 25—New production record of 1,466 tons in one shift set by a 14-man crew at Mine 207, Consolidation Coal Co. (Ky.).

Oct. 1—Pittsburgh's anti-smoke law goes into effect, accompanied by shortage of permissible coals.

Oct. 7—ICC grants temporary freight-rate boost of 10c. per net ton on coal, as well as other increases, pending further hearings.

Oct. 11—FPC authorizes delivery of 450,000,000 cu.ft. of natural gas daily to Philadelphia and the Appalachian area through Big and Little Inch pipelines.

Oct. 23—Anthracite Institute holds first press showing of commercial-model Anthratube.

Nov. 8—N.C.A. establishes new Safety Department.

Dec. 9—Directors of Anthracite Institute approve big promotional and advertising program for 1948.

Dec. 12—U.M.W.A. withdraws from A.F.L.

Dec. 16—Lewis demands \$1,200 annual pension for 60-year-old miners with 20 years' service.

Dec. 30—ICC adds another 10c. to October freight-rate increase.

mine owners and the union joined in a safety promotion-and-training program, and near Charleston, W. Va., the union sponsored a series of safety meetings among miners, with management participating. In southern Illinois, union spokesmen at the end of the year declared that mine management was giving full cooperation in improving workers' safety. In the anthracite field, the annual Middle and Southern regional first-aid meet, suspended during the war, was reinstituted in August with operators, the union, the State Department of Mines and the U. S. Bureau of Mines taking part.

Operators Act on Safety

On the operators' side, better electrical systems, better timbering plans, better machinery, improved housekeeping, more rock dusting and sprinkling, better ventilation, and constant drumming on safety were aimed at improving the record in individual mines. On an industry-wide basis, organization of a new safety department within the National Coal Association, to be headed by a top-flight engineer, was outlined early in November with promise of a full-scale program for 1948.

Sale of company-owned dwellings to miners, or to real-estate companies with the provision that miners be given first option on their purchase, continued through the year, giving miners an added degree of independence and augmenting the stability and self-respect of the industry's working force.

As compared with 107,000,000 tons in 1946, tonnage losses due to stoppages in 1947 amounted to only 19,000,000 tons. The only organized halt in production came when Lewis called a six-day mourning period after the Centralia explosion. At the end of the mourning period, however, work was resumed as fast as mines could be reopened after Secretary Krug's safety shutdown. Early in June, some 15,000 anthracite miners stayed at home for several days to protest probable passage of the Taft-Hartley bill and after it became law, an estimated 250,000 miners in several states stopped work for various periods in a show of feeling against the act.

Local wildcat stoppages on local issues slowed down operations in scattered regions and, at the year's end, Lewis' request for a \$100 monthly pension for 60-year old miners with 20 years of employment cast a shadow on the year

ahead. However, on the whole, 1947 was a good year in the industry's labor relations. New labor laws, increased training, better supervision and a high wage scale promised a good year in 1948, barring unreasonable demands by union leadership.

Coal's big competitors, oil and natural gas, grew to larger stature in 1947. At the first of the year, on the locomotive front, the Pennsylvania R. R., with an order for 25 new diesel-electric locomotives, and the Erie R. R., with orders for 34, joined a parade described in the American Locomotive Co.'s announcement in February as resulting in 95 percent of its orders for new locomotives calling for diesels. Near the end of the year, in December, the New York Central R. R. ordered 111 new diesels at a cost of \$21,000,000 and the nation-wide picture showed a total of 1,176 locomotives on order, only 33 of which were for steam. Meanwhile, liquid-fuel consumption by railroads was up about 3 percent over 1946, against a coal increase of 0.5 percent.

In the electric utilities field, while coal consumption rose about 28 percent over 1946 to some 88,000,000 tons, oil use increased some 40 percent to about 50,640,000 bbl. However, against the growing use of natural gas for generating electric power, up about 20 percent to 367,000,000 M.c.f., coal's 28-percent rise did not look too bad.

In home heating, with some loosening of a tight oil-burner supply over the year, oil-burner sales nearly tripled the number for 1946, rising 161.7 percent to 1,306,000 units. Residential sales of natural gas increased 23 percent over 1946, commercial sales being close behind with a rise of 22.9 percent.

In the over-all production picture, crude oil was up 7 percent to an estimated 1,855,000,000 bbl. and natural gas was up about 14 percent to 2,503,637,000 M.c.f. The gas industry listed 21,311,000 customers—domestic, commercial and industrial—against 20,636,300 in 1946.

However, in spite of forward strides that made the competition tougher for coal, the oil and natural-gas industries had their setbacks, largely in a shortage of product and transportation facilities. Many customers in the East and Middle West went cold and there was some idleness in factories when gas supplies ran short in the winter of 1946-47. And, as 1947 drew to a close, gas and oil men joined in a warning that the coming

winter would be little if any better and might be even worse. Earlier, in October, although the natural-gas industry was building new pipelines and had taken over the Big and Little Inch lines, the chairman of the Federal Power Commission had warned gas interests against over-expansion "until transmission capacity has a chance to catch up."

Some suppliers of oil in the East rationed their retailers in November and December and oil companies bought newspaper space to tell customers how to save fuel. Officials in several Eastern cities banned further installation of oil burners as a precaution against serious shortages running as high as 15 percent and officials of government agencies in Washington met to explore the need for conversion of some federal heating plants from oil to coal. Tight fuel supplies were aggravated by temperatures running 29 percent colder in five Eastern cities, as compared to last winter.

With dwindling reserves and tight supplies of oil and natural gas, adequate though spotty supplies of coal and unprecedented demands for power and heat by home, farm and industry, the possibility increased that in the years ahead coal, oil and gas men will join together as energy suppliers to the nation. First step in this trend might well be the joint gasification project of the Pittsburgh Consolidation Coal Co. and the Standard Oil Development Co.

Research Takes Big Strides

Meanwhile, however, to meet competition in 1947, the coal industry kept active in research, merchandising and public relations. Researchwise, the year was one of new plans announced and old plans realized. In October, the first commercial Anthratube units, result of three years of research and development by the Anthracite Institute to find a better way to burn anthracite for home heating, went on sale and the Anthracite Advisory Committee reported experimental installation of new-type mining machinery to boost efficiency. At the Anthracite Institute laboratory in Wilkes-Barre, Pa., and in widely scattered laboratories and universities, the anthracite industry continued its testing and certification of home burning equipment and investigated new uses for anthracite in chemistry, welding, foundry work, gasification, tobacco curing, water purification, etc.

Meanwhile, Bituminous Coal Research, Inc., with a 1947 budget of \$447,000 and an enlarged membership of 256 coal companies and associations, 14 railroads and three equipment manufacturers, reported advances in six projects on railroad utilization of coal, 15 on household uses, eight on industrial uses and two on mining and preparation. Earlier, in February, the Locomotive Development Committee, operating under a separate budget and administration, ordered two chassis for the new coal-burning gas-turbine locomotives and put into operation a pilot-plant combustion unit at Dunkirk, N. Y. By the end of the year, full-scale coal-handling and combustion tests were under way at Fontana, Calif. Two additional railroads and one additional coal company joined the Locomotive Development Committee in 1947.

Comprehensive industry projects in small-home design, ash removal and firing tools were pushed by the Joint Technical Committee for the Anthracite, Bituminous and Coke Industries.

Companies Seek New Products

Several coal companies carried on their own research projects independently of industry-wide agencies. Most notable developments of the year, perhaps, were the letting of a contract to build a million-dollar pilot plant to convert coal to oil and gas in a joint project of the Pittsburgh Consolidation Coal Co. and the Standard Oil Development Co. and the successful underground gasification of coal in a joint undertaking by the Alabama Power Co. and the U. S. Bureau of Mines. In addition, several new private coal-treatment plants went into production or were planned during the year, including the new Disco plant at Champion, Pa., and at least two new char plants in Utah. As for utilization, Commonwealth Edison Co., Chicago, announced that a single test unit of a cyclone coal burner had been so successful that a full-size unit will be built to generate power in 1948.

Federal and state governments also shared in coal research. In addition to its part in underground gasification at Gorgas, Ala., the U. S. Bureau of Mines announced earlier in the year that several experiment stations had produced oil from coal and oil-shale at a cost of 7½ to 9½¢. per gallon. In October, the Bureau announced that a new \$450,000 anthracite laboratory would be built at Schuylkill Haven,

Pa., for operation by July, 1948.

In September, the Illinois State Geological Survey and the University of Illinois reported that four years of research had uncovered an annual market for 1,000,000 tons of Illinois coal for making metallurgical coke and Northwestern University described the use of a spiral concentrator and a hydraulic classifier for better cleaning of coal. At least two states, Illinois and West Virginia, opened new laboratories for testing samples of mine air.

The public-relations programs of the several industry organizations and individual companies paid off in a growing favorable opinion of coal through the year. In January, the Bituminous Coal Institute gave wide distribution to a 24-page booklet, "Bituminous Coal Mining Towns." Throughout the year, B. C. I. staged special ceremonies to present original Rockwell Kent oil paintings, symbolizing coal, to colleges and universities in coal-mining states. And in November, with the opening of the special session of Congress, B. C. I. launched a series of daily 10-minute radio newscasts called "Congress Today." Earlier, at the Chicago meeting of the National Coal Association in October, B. C. I. was made a division of the N. C. A. for greater efficiency and better coordination with other activities of the national organization.

Coal Heating Service, another division of the N. C. A., aimed at the promotion of bituminous coal through better service to home users, swung into stride in 1947 and at the year's end counted on its roster 1,000 retail dealers in 27 different cities, counties and areas doing an estimated 10,000,000 tons of business a year.

Appalachian Coals, Inc., set up a series of five-minute broadcasts over 75 radio stations to tell the facts about coal, and several companies, like the Philadelphia & Reading Coal & Iron Co. and the Hanna Coal Co., ran their own radio programs and newspaper publicity to sell coal and the coal industry to the public.

Smoke, however, remained a thorny problem for the bituminous industry at the end of the year, though advances were marked up in wider application of over-fire air and steam jets for railroads and commercial and industrial plants, and in wider knowledge of proper firing methods among home owners and plant operators. Much of this improvement was due to Bituminous Coal Research, Inc., and the

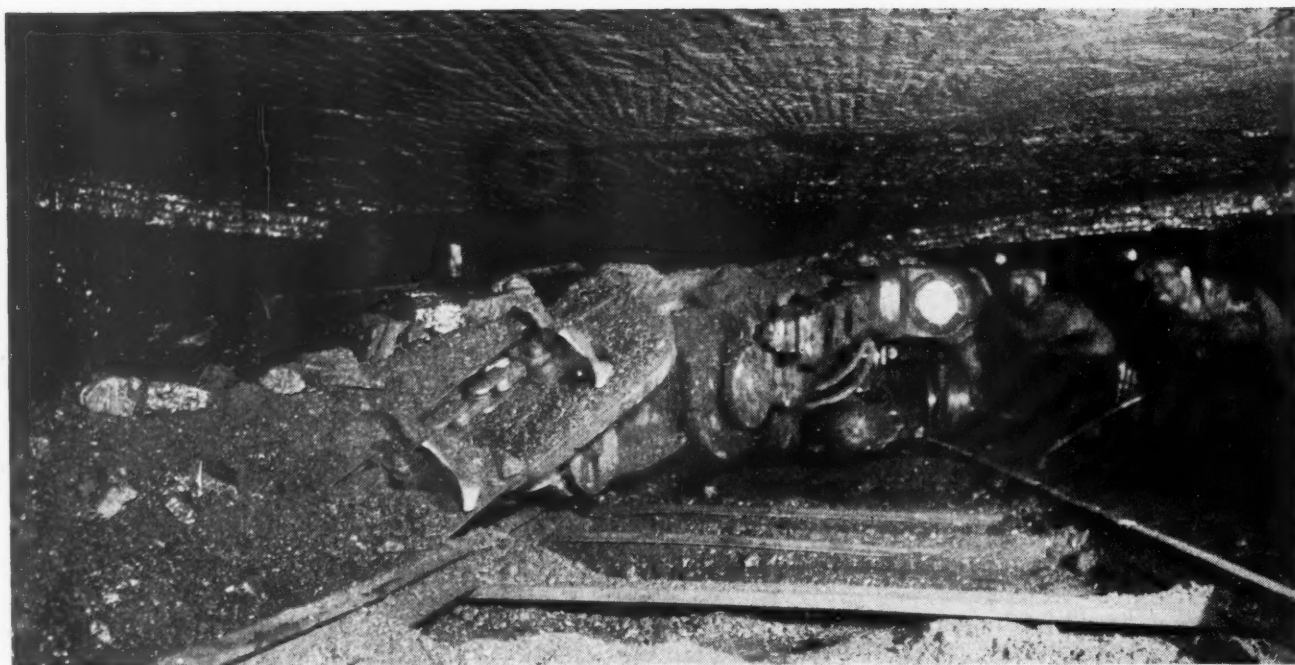
Coal Producers' Committee for Smoke Abatement—the former developing fire methods and equipment and the latter conducting educational work among city councils and civic groups.

During the year, there was agitation for new anti-smoke laws or strict enforcement of existing laws in more than 70 cities. Representatives of the Coal Producers' Committee for Smoke Abatement advocated sensible provisions in proposed laws to prevent such distress as accompanied strict enforcement of the Pittsburgh ordinance and repeated in public and private hearings that the real answer to smoke problems is proper firing and efficient equipment.

On the anthracite side, the Anthracite Institute in 1947 stepped up the pace of its dealer schools in merchandising and utilization and announced at the end of the year the start of a large advertising and promotional campaign to sell the advantages of anthracite and anthracite burning equipment. Commitments by member companies for 1948 already totaled \$650,000 in December and plans were being made to use newspaper, magazine and trade paper space as well as booklets, folders, dealer helps and direct-mail materials. Meanwhile, to assure uniform quality to anthracite users, the industry stood squarely behind the Pennsylvania legislature's enactment of the Anthracite Standards Law, which became effective Sept. 1, and adopted a seal to mark quality products.

Coal Shares Rosy Forecast

Adding it all up, 1947 was a good year for coal. The year's end also contained seeds for a good year in 1948. The industry was on a sound financial footing, excuses for government meddling seemed remote and the supply squeeze in other fuels, together with coal's efforts in its own behalf, had done much to restore public confidence in coal as a fuel and an industry. Coal seemed likely to share in rosy forecasts for the nation's economy in the first half of 1948. Growing power demands, record activity in heavy and light construction and a high level of business activity predicted for 1948 opened up new opportunities for coal, with the probability that export needs would make the picture even brighter. The big need, it appeared, was increased output of certain specialized sizes, requiring a bigger investment in preparation facilities.



MECHANICAL-MINING PROGRESS in 1947 included wider use of power-loading equipment in thin seams.

Machine Era Spreads in Coal

Machine Loading Marks Up New Gains in 1947—Strip Progress Characterized by Increased Use of Equipment Designed for Thicker Overburden—Fine Sizes Emphasized in Preparation Developments

ANOTHER INCREASE in the percentage loaded mechanically paced developments in deep mining in 1947, particularly in the bituminous industry. Stripping activity continued high, with both industries increasing their installation of large walking draglines. In preparation, the capacity of mechanical-cleaning installations jumped still more and both anthracite and bituminous stepped up their work in the treatment of fine sizes.

Along with conventional types of conveyors and loading machines, including a substantial number designed for low-seam operation, installations included an increasing number of power duckbills for both thick and thin seams, as well as more shortwall-type cutting-and-loading machines and a number of new rubber-tired units designed for use with chain-type room conveyors in low seams. The anthracite industry made additional use of rock-type loaders, particularly in gangway work, and continued ex-

perimental work on such items as the coal planer for semi-longwall operation, a shearing machine and a scraper-type driver for gangway work.

Interest and activity quickened in the development and installation of machines able to dig their own coal out of the solid and load it. Funds for the BCR mining-and-loading-machine development program were reported to be nearly completely pledged. Work on several existing models of mining-and-loading-machines continued, with one manufacturer announcing that it expected to have a commercial machine, or machines, ready for distribution in the near future.

While new machines were being studied and developed, operators continued efforts to increase the productivity of units already in service. As a result, a new record in tons per machine shift was set on Sept. 25 at Mine 207 of the Consolidation Coal Co. (Ky.). Using a crawler loader serviced by two shut-

tle cars, and mining in a height of 60 in., a 14-man crew got out 1,466 tons. The previous high, according to *Coal Age* records, was 1,402 tons, loaded by a 20-man crew at Mine 38, Consolidation Coal Co. (W. Va.) Sept. 16, 1946.

Work on improving unit and individual productivity included revisions in mining plans to better suit them to mechanical operation. Once again, the number of operators working with two to four places per unit showed an increase. One reason given for this practice was the time involved in moving in thin coal. Contrariwise, another numerous group was increasing number of places per unit, offering as one reason greater return on investment through higher unit and per-man output.

Improvements in transportation continued to rank high as a means of raising loader and per-man tonnage. Installation of big cars was especially active, and reports indicated that a 25-ton unit was, if not already in service, not too far in the future. Even in thin coal operators were installing the largest possible cars. In at least one instance, at a mine using track loaders, a big wide car was strip-loaded—first one side and then the other—to speed the process and get more coal aboard. The "continuous mine car," a series of cars with over-



LARGE DRAGLINES AND SHOVELS paced 1947 stripping developments.

lapping ends to permit loading without stopping a conveyor or using special transfer equipment, also found increasing use, along with vibrating loaders to pack the coal down and various transfer units to eliminate spillage and stopping conveyors while changing cars.

Service to loading machines with mine cars was marked by over a year's experience with a dual-speed gathering and swing locomotive and by a major increase in the use of prefabricated track layouts, especially in low coal. Such layouts were materially simplified in 1947, adding substantially to their flexibility.

Big Barney-type hoists for handling trips past conveyors or elevators were installed in increasing numbers. In contrast, a number of reduced-size spotting hoists for light service were put on the market in 1947.

Rubber-tired haulage and the use of belt conveyors again racked up substantial gains in 1947. As a natural result, combinations of shuttle cars and belts also increased. Reflecting increased use of shuttle cars on light to moderate pitches, at least one shuttle car-belt installation was delivering coal up a 7-percent grade out of a section dipping 9.8 percent. Work continued on ways and means of best achieving the transfer from shuttle car to belt. The number of shaker feeders in such service increased substantially, with users contending that experience shows them to be, if not the best, one of the best

answers. Where elevators are used, a number of operators adopted the practice of setting them on an angle to permit shuttle cars to come to them from two directions. Several operators using shuttle cars also adopted the practice of dumping coal into storage places to keep the loader working in spite of elevator outages, car shortages or other delays, counting rehandling later as less expensive than letting the unit go down.

Steel-reinforced and nylon-cord belts greatly extended belt-conveyor reach in 1947, giving added impetus to the use of belt slopes for bringing the coal to the surface at new mines. As a result of experience with mechanical sinking of a number of earlier belt slopes, it was being held in 1947 that flattening the angle to about 15 deg. results in a cost reduction in spite of the increased length through making the work easier and more efficient. The use of steel liner plates for both slopes and shafts showed an increase. Where cars are handled on slopes, the year was marked by a major increase in the number of hoists equipped for dynamic braking.

Mines with older and smaller shafts continued to resort to installations of big cars at the face in conjunction with transfer stations for reloading the coal into smaller cars for hoisting. At least one operator, however, solved the problem by installing a counterweighted light-alloy side-dumping cage, replacing the two original smaller

cages, to permit bringing the new big cars to the surface.

Construction of new portals to reduce travel time and make things easier for men continued at a high level in 1947. Self-service elevators were included in several, getting away from the problems and hazards of handling men on regular cages. In line with the trend toward increased use of steel surface buildings, including portable types for substations and the like, at least one new portal set-up was based on Quonset-type construction. For taking men to their working places underground, special large, safe and comfortable man-trip cars were installed by numerous companies in 1947. Where men have to climb grades outside, so-called "skeetow" installations to reduce the climbing effort were put in by additional companies. At least one slope-belt installation also was being designed for bringing men to the surface from the bottom.

Underground installation of loaders and conveyors at the face was being paralleled by increased use of special equipment for trackless-mining, including large rubber- and crawler-mounted universal cutting and shearing machines and drills. In the case of mounted drills, power positioning of arms and heads moved farther into the foreground. The use of special alloy or insert bits for both cutting and drilling made great strides in 1947. In drilling, 1947 witnessed increasing use of air equipment and portable compressors for both coal and rock drilling, using rotary units for coal and percussion for rock. Where much rock work must be done, a number of operators consider air for everything more flexible and satisfactory. The year also was marked by a major increase in the number of power bugbusters on shortwall machines, with material savings in the forms of better cuttings elimination, labor, power, air clearness and reduction of dust.

New auxiliaries for trackless mining included rubber-tired tri-cycle-mounted pumps and air compressors, as well as special drill and equipment carts and mounts. At one operation, the mine force designed a two-wheeled rubber-tired carrier with plow-type handles for moving hand-held drills. For delivering supplies and moving equipment, operators went more and more to crawler-type pullers, car-mounted winches, crawler-, rubber-tired or track-mounted equipment carriers, rubber-tired self-propelling supply trucks and tractor-trailer

units for moving materials and parts. Where conveyors are used, the false pan-line system of getting supplies to the face made additional gains, along with the use of small hoists in pitching places.

Timbering machines—track, crawler or rubber-tired—were installed as fast as they became available in 1947. Timbering practice also was distinguished by a major increase in the number of mines using crossbars and some form of pin-type support in hitch holes at the face. Plain pins, stirrup-type pins and pins with channel seats welded on them were among the types employed, along with pin-and-jack combinations with the pins in holes near the bottom as supports for short jacks holding the bars.

Electrically, the trend toward rectifiers and non-inflammable transformers continued, along with sectionalization of cables serving face equipment and installation of special permissible-type junction boxes and controls. Interest in central metering continued high, along with interest in proper sectionalization of d.c. systems. Several mines in 1947 revised sectionalization practices to conform to recommendations of a special committee concerned with fire prevention.

Frame grounding of mining equipment continued as an industry problem. However, progress was made and new protective devices developed, including safety-circuit centers with magnetic-trip circuit breaks, nip circuit breakers operating on fault currents in an auxiliary ground wire and special contactors on machines to cut off current in the machines themselves in case of shorts or arcs.

The growing importance of maintenance was highlighted by such facts as a \$400,000 expenditure for one mine shop. The number of specialized lubricating trucks showed a substantial increase, along with the installation of centralized automatic systems, not only in preparation plants, but on such mining equipment as loaders and cutters. Reflecting the growing use of belts, an increasing number of operators installed special shops for repair, reconditioning and splicing. Facilities included drying units and tables long enough to accommodate full-length 300-ft. sections.

Hydraulic brakes, hydraulic controls and dynamic braking on hoists and locomotives were among the newer equipment and practices leading to lower maintenance. As with other equipment, new main-line locomotives included special

New Bituminous Preparation Facilities in 1947*

Coal Company	Plant Location	Capacity, Net Tons of Feed per Hour	Preparation Equipment
Atlantic Crushed Coke Co.	New Derry, Pa.	15	Deister Machine ¹
Barnes & Tucker Co.	Bakerton, Pa.	400	Roberts & Schaefer ²
Benedict & Sherman Surface Coal Mining Co. ...	McArthur, Ohio	125	Prins ³
Walter Bledsoe & Co.	Terre Haute, Ind.	400	McNally-Pittsburg ⁴
Blue Bird Coal Co.	Harrisburg, Ill.	185	Jeffrey ⁵
Blythe Bros. Co.	Red Jacket, W. Va.	300	McNally-Pittsburg
Brookside-Pratt Mining Co.	Brilliant, Ala. (2)	30	Deister Machine ¹
Brule Smokeless Coal Co. ...	Otsego, W. Va. ....	...	Kanawha ⁶
Cameo Coal Co.	Cameo, W. Va.	200	Jeffrey ⁵
Cardinal Coal Co.	Madisonville, Ky.	400	McNally-Pittsburg ⁷
Carbon Fuel Co.	Carbon, W. Va.	300	Roberts & Schaefer ⁸
	Carbon, W. Va.	40	Roberts & Schaefer ⁹
	Carbon, W. Va. (2)	190	Roberts & Schaefer ¹⁰
	Wevaco, W. Va.	350	Fairmont ¹¹
Central Elkhorn Coal Co. ...	Lackey, Ky. (2)	75	Jeffrey ⁵
Central Indiana Coal Co. ...	Plainville, Ind. (3)	45	Deister Machine ¹
Clinchfield Coal Corp.	Dante, Va.	400	Fairmont ¹¹
	Dante, Va.	200	Fairmont ¹¹
	Elk Creek, W. Va.	400	Fairmont ¹¹
Consolidation Coal Co. (Ky.)	Jenkins, Ky. (2)	80	Link-Belt ¹²
Darr Smokeless Coal Co. ...	Twin Branch, W. Va. ...	50	Kanawha ¹³
Dartmont Coal Co.	Dartmont, Ky.	115	Link-Belt
Dayton Coal Co.	Surosa, W. Va.	75	Jeffrey ⁵
Delta Collieries Corp.	Marion, Ill.	200	Templeton-Matthews
Diamond Smokeless Coal Co.	Boltz, Ky.	300	McNally-Pittsburg ⁷
W. G. Duncan Coal Co. ...	Greenville, Ky.	200	McNally-Pittsburg ⁷
		55	Cent. & Mech. Ind. ¹⁴
Eastern Gas & Fuel Associates	Kopperston, W. Va.	300	McNally-Pittsburg ¹⁵
	Wharton, W. Va.	500	Menzies ¹⁶
Elk Creek Coal Co.	Emmett, W. Va.	200	Link-Belt ¹⁶
H. C. Frick Coke Co.	Robena, Pa. (48)	450	Deister Concentrator ¹⁷
Gay Coal & Coke Co.	Mt. Gay, W. Va.	40	Kanawha ¹³
Glogora Coal Co.	Blue Pennant, W. Va. ...	400	Roberts & Schaefer ²
Grapevine Coal Co.	Madisonville, Ky.	65	Jeffrey ⁵
Gulf Smokeless Coal Co. ...	Tams, W. Va.	40	Wilmo ¹⁸
Hanna Coal Co.	Dun Glen, Ohio (2)	80	Cent. & Mech. Ind. ¹⁴
Hatfield-Campbell Creek Coal Co.	Pt. Lick, W. Va.	350	Jeffrey ¹⁹
Imperial-Cardiff Coal Co. ...	Nettleton, Pa.	175	Jeffrey
Industrial Collieries Corp. ...	Ellsworth, Pa. (16)	160	Deister Concentrator ¹⁷
Inland Steel Co.	Wheelwright, Ky.	750	Link-Belt ²⁰
Island Creek Coal Co.	Delbarton, W. Va.	75	Roberts & Schaefer ²¹
	Delbarton, W. Va.	400	Roberts & Schaefer ²²
	Holden, W. Va.	400	Link-Belt ²³
Jackson Mining Co.	Verdunville, W. Va.	300	Roberts & Schaefer ²²
	Brounland, W. Va.	75	Link-Belt ²⁴
Johnstown Coal & Coke Co. ...	Ruthford, W. Va. (2) ...	200	Fairmont ¹¹
Jones & Laughlin Steel Co.	Crichton, W. Va.	50	Jeffrey ⁵
Lambert Coal Co.	California, Pa.	2,000	Jeffrey ⁵
Leckie Smokeless Coal Co.	Seth, W. Va.	75	Nelson L. Davis ²⁴
Lillybrook Coal Co.	Anjean, W. Va.	150	Jeffrey ⁵
Mahan-Ellison Coal Corp. ...	Killarney, W. Va.	50	Roberts & Schaefer ²⁵
Midwest Radiant Corp. ...	Lansing, Tenn.	300	McNally-Pittsburg
Morgan Mines, Inc.	Millstadt, Ill.	17	Link-Belt ¹²
Muskingum Coal Co.	Marion, Ill.	200	McNally-Pittsburg ⁴
The New River Co.	Leesville, Ohio (2)	130	Cent. & Mech. Ind. ¹⁴
	Carlisle, W. Va.	225	Kanawha ¹⁹
	Cranberry, W. Va.	225	Kanawha ¹⁹
	Lochgelly, W. Va.	160	Kanawha ⁵
	Skelton, W. Va.	225	Kanawha ¹⁹

features for reducing maintenance. One new installation was a 50-ton tandem unit for operation over a 5-percent grade against the loads—installed in preference to a rope system to take care of a growing haul.

Interest in diesel locomotives showed a substantial increase in 1947, thus bringing closer the day when units may be expected to go into service. To handle communi-

cation in haulage and elsewhere, frequency-modulation "radio" was installed at a long list of mines.

In the field of pumping and drainage, quick-coupling pipe staged a major advance. Another development perhaps heralding a trend was putting deepwell turbine pumps underground and thus getting away from some of the priming and other difficulties, as well as the added expense, of surface installation.

New Bituminous Preparation Facilities in 1947*

Coal Company	Plant Location	Capacity, Net Tons of Feed per Hour	Preparation Equipment
Old Ben Coal Corp.	West Frankfort, Ill.	450	McNally-Pittsburg ¹
	West Frankfort, Ill.	150	Kanawha ^{1a}
	West Frankfort, Ill.	150	Kanawha ^{1a}
Pardee & Curtain Lbr. Co.	Bergoo, W. Va.	25	Jeffrey
Peabody Coal Co.	Harco, Ill.	40	Link-Belt ^{1a}
Peters Creek Coal Co.	Summersville, W. Va. (2) ..	540	Roberts & Schaefer ^{2a}
Porter Elkhorn Coal Co. ..	Martin, Ky.	150	Jeffrey
Powhatan Mining Co.	Powhatan Pt., Ohio.....	100	Roberts & Schaefer ^{2a}
	Powhatan Pt., Ohio.....	400	Roberts & Schaefer ²
	Powhatan Pt., Ohio.....	...	Kanawha ²⁷
Pittsburgh Coal Co.	Mathies, Pa. (2).....	825	Fairmont ^{1a}
	Mathies, Pa.	30	Cent. & Mech. Ind. ^{1a}
Raleigh-Wyoming Mining Co.	Glen Rogers, W. Va. ...	70	Kanawha ^{1a}
Raven Red Ash Coal Co. ..	Red Ash, Va.	40	Roberts & Schaefer ^{2a}
Red Jacket Coal Corp.	Coal Mountain, W. Va. ...	130	McNally-Pittsburg ²⁷
Red Parrot Coal Co.	Keith, W. Va.	200	Kanawha ²
Rich Hill Coal Mining Co. Rochester & Pittsburgh Coal Co.	Hastings, Pa.	300	Jeffrey
Rough River Coal Co.	Lucerne Mines, Pa. (4) ..	200	Cent. & Mech. Ind. ^{1a}
Semet-Solvay Division	Centertown, Pa.	350	McNally-Pittsburg ²⁷
Sentry Coal Mining Co. ...	Longacre, W. Va. (26) ..	200	Heyl & Patterson ^{2a}
Simpson Creek Collieries Co.	Rockport, Ky.	800	McNally-Pittsburg ²⁷
Sparta Coal Co.	Galloway, W. Va.	40	Roberts & Schaefer ²
Sunnyhill Coal Co.	Coulterville, Ill.	35	Roberts & Schaefer ²
Templeton Coal Co.	Rehoboth, Ohio	300	McNally-Pittsburg ²⁷
Triple S Coal Co.	Latta, Ind.	55	Cent. & Mech. Ind. ^{1a}
Tucker Coal Co.	Augusta, Ill.	200	McNally-Pittsburg
Universal Const. Co.	Cedar City, Utah.....	20	Roberts & Schaefer ²
V. & C. Coal Co.	Richlands, Va.	300	McNally-Pittsburg
Valley Camp Coal Co.	Grays, Ky.	115	Link-Belt
Warner Collieries Co.	Elm Grove, W. Va.	140	Kanawha ^{2a}
Waterloo Coal Co.	Bergholz, Ohio	350	Roberts & Schaefer ²
	Mammath, W. Va.	350	Roberts & Schaefer ²
Weirton Coal Co.	Waterloo, Ohio	80	McNally-Pittsburg
Woodward Iron Co.	Morgantown, W. Va. (2) ..	250	Link-Belt ^{2a}
Wyoming Mining Corp. ...	Woodward, Ala.	60	Cent. & Mech. Ind. ^{1a}
	Lynco, W. Va.	250	Roberts & Schaefer ²

*Includes additions and installations of new preparation equipment in existing structures. Where more than one unit was installed in a plant, the number, when available, appears in parentheses following the plant address.

¹No. 16 Plat-O coal-washing-table equipment. ²Including R&S hydroseparator and Stump Super-Airflow cleaning equipment. ³Including Prins multistage washing equipment. ⁴Including McNally-Norton automatic coal-washing and McNally-Carpenter centrifugal drying equipment. ⁵Including diaphragm-jig washing equipment.

⁶Preparation-plant redesign, including Kanawha-Belknap chloride washing equipment. ⁷Including McNally-Norton automatic washing equipment. ⁸Including R&S hydroseparator equipment. ⁹R&S Hydrotator equipment. ¹⁰Including Stump Super-Airflow and R&S Hydrotator equipment.

¹¹Including Chance-cone cleaning equipment. ¹²L-B Multi-Louvre coal-drying equipment. ¹³Kanawha-Belknap chloride washing equipment. ¹⁴C-M-I continuous

centrifugal drying equipment. ¹⁵McNally-Menzies cone separators.

¹⁶Including L-B air-pulsated jig and centrifugal dryer. ¹⁷SuperDuty No. 7 diagonal-deck coal-washing tables plus revolving feed distributors as follows: Frick, 6; Industrial Collieries, 2. ¹⁸Wil-mot hydroseparator equipment. ¹⁹Including Jeffrey Baum-jig equipment. ²⁰Including two L-B air-pulsated jigs, 18 Delster Concentrator tables and centrifugal dryers.

²¹Including R&S Hydrotator classifier equipment, Bird filters and Raymond flash-dryer equipment. ²²Including L-B combination trough and air-pulsated wash box with a capacity of 325 t.p.h. and flash-drying equipment. ²³Including Kanawha-Belknap chloride washing equipment. ²⁴Including heavy-media separators. ²⁵Stump Air-Flow equipment.

²⁶Including R&S hydroseparator and Hydrotator equipment. ²⁷River tipple. ²⁸Twenty Delster Concentrator tables and six Bird filters. ²⁹Including two L-B air-pulsated jigs, raw-coal blending bin and centrifugal dryers.

Along with other measures for safety, the number of fire, rescue and ambulance cars showed a major increase in 1947. In that year, also, bleeding of sealed areas, as well as solid coal, through boreholes increased substantially, along with the practice of providing special bleeder and escape entries. Ventilation improvements included a major rise in splitting, the use of demountable-block stoppings and a

test in one mine of plastic coating of stoppings. Air breaking of coal staged a major advance as a result of legislation and safety regulations. Spraying and sprinkling, including the use of special chemical cartridges and automatic proportioners, was practiced at many additional mines, and 1947 brought announcement of a special fog gun for knocking down dust and fumes in shooting.

STRIPPING

The march of stripping in 1947 resulted in a major increase in the number of shovels with 40-cu.yd. dippers and in the number of large walking draglines carrying buckets up to 30 cu.yd. More power, more capacity and longer range also was being built into smaller units for outcrop and other stripping in the newer areas of the East and South. Auxiliaries, as pointed out in the roundup of stripping progress in the January, 1948, *Coal Age*, p. 70, also were growing in size, while new items, such as rubber-tired tractors, were being offered to increase efficiency.

Higher wages, other increased costs and thicker overburden were the major factors in revisions in equipment and practices in 1947. For these reasons, and particularly thicker overburden, greater digging and dumping heights and casting ranges were being built into new stripping units. For the same reasons draglines were being called upon more and more to handle the entire stripping job. However, more study of the stripping problems and the characteristics of the various types of equipment available was clarifying the field of combination or tandem operation.

As in the past, use of auxiliary equipment—such as draglines, scrapers, wheel excavators and tower machines—was relied on in 1947 to help out shovels in deep overburden in the bituminous industry. In anthracite, a number of operators were calling more on trucks—particularly new higher-capacity units—for handling overburden at depths considered to unduly handicap shovels or draglines. But with deeper overburden and increasing dumping heights and casting distances, considerable thought was being given to the possibility of eliminating haulage berms in pits to reduce the spoiling problem. Also, some authorities were contending that putting a dragline on the spoil bank to pull back material thrown over to it by the shovel might be the best practice under certain conditions.

Another step suggested to cut the cost of handling deeper overburden was operation of both a shovel and a dragline on a bench, as compared to the conventional practice of both on the coal or the shovel on the coal and the dragline on the bank. Under this new proposal for tandem operation, the shovel would precede the dragline and take off the top of the bank, leaving the bottom section for the

New Anthracite Preparation Facilities in 1947*

Coal Company	Plant Location	Capacity, Net Tons of Feed per Hour	Preparation Equipment
Adelphi Coal Mining Co. . .	Avoca, Pa.	8	Deister Concentrator ¹
Ashland Hydrotator Coal Co.	Ashland, Pa. (4)	70	Wilmot ²
Blackwood Construction & Supply Co.	Frackville, Pa.	50	Wilmot ³
Buck Run Colliery Co. . . .	Buck Run, Pa. (2)	30	Deister Machine ⁴
Capone Coal Co.	Avoca, Pa. (2)	48	Wilmot ³
Colitz Coal Co.	Pottsville, Pa.	35	Wilmot ³
Creekside Coal Co.	Ashland, Pa. (2)	30	Wilmot ³
Darkwater Coal Co.	Darkwater, Pa.	15	Wilmot ³
Duryea Anthracite Coal Co.	Hudson, Pa. (3)	30	Deister Concentrator ¹
Equitable Fuel Corp.	Audens Reid, Pa. (14)	140	Deister Concentrator ⁵
Exchange Coal Co.	Atlas, Pa. (2)	40	Wilmot ³
A. L. Forney Coal Co. . . .	Danville, Pa.	15	Deister Concentrator ¹
G. & M. Coal Co.	Rocky Glen, Pa.	7	Menzies ⁷
Haddock Mining Co.	Beaver Meadow, Pa.	60	Wilmot ³
Harry E. Coal Co.	Swoyersville, Pa. (8)	64	Deister Concentrator ⁶
Hoover Coal Co.	Paxinos, Pa.	22	Menzies ⁷
Indian Head Coal Co. . . .	Tremont, Pa.	90	Menzies ⁷
Indian Run Coal Co.	Cressona, Pa. (4)	70	Wilmot ³
Jonathan Coal Co.	Dornsife, Pa.	8	Deister Concentrator ¹
K. D. T. Coal Co.	Danville, Pa. (2)	24	Deister Concentrator ¹
G. F. Keller	Port Trevorton, Pa. (2)	16	Deister Concentrator ¹
Kopenhagen & Dietrich Coal Co.	Shamokin, Pa.	20	Wilmot ³
Landingville Coal Co. . . .	Landingville, Pa.	15	Wilmot ³
Live Oak Coal Co.	Minersville, Pa.	30	Wilmot ³
Locust Valley Coal Co. . . .	Mahanoy City, Pa. (4)	145	Wilmot ³
Lykens Coal Co.	{ New Boston Jct., Pa. (3)	60	Wilmot ³
	{ New Boston Jct., Pa. (4)	60	Wilmot ³
M. & M. Coal Co.	Schuylkill Haven, Pa.	10	Deister Concentrator ¹
Anthony Malko	Lavelle, Pa.	15	Wilmot ³
Mammoth Coal Co.	Raven Run, Pa.	22	Menzies ⁷
Markson Coal Co.	Goodspring, Pa. (2)	92	Menzies ⁷
McKee Coal & Sand Co. . . .	Port Trevorton, Pa.	10	Deister Concentrator ¹
Franklin I. Miller	Ravine, Pa. (2)	40	Wilmot ³
Millersville Colliery Co. . .	Millersville, Pa. (2)	44	Menzies ⁷
Moffat Coal Co.	Scranton, Pa. (2)	100	Wilmot ³
Natalie Coal Co.	Natalie, Pa.	50	Wilmot ³
Oak Ridge Mining Co. . . .	Raven Run, Pa. (2)	44	Menzies ⁷
Oxford Coal Co.	Pittston, Pa. (6)	48	Deister Concentrator ⁶
Wm. Prentiss	Danville, Pa.	12	Deister Concentrator ¹
Reidinger Coal Service . . .	Paxinos, Pa.	20	Wilmot ³
Rhoads Contracting Co. . .	Mahanoy City, Pa.	275	Link-Belt ⁹
Schrader Coal Co.	Minersville, Pa. (2)	55	Wilmot ¹⁰
Sickler Estate	Plymouth, Pa. (3)	30	Deister Concentrator ⁶
Silverton Coal Mining Co. .	Cressona, Pa.	24	Deister Concentrator ¹¹
Simpson Coal Co.	Simpson, Pa.	5	Menzies ⁷
T. F. Steel Coal Co.	Junedale, Pa. (2)	50	Wilmot ³
Stevens Coal Co.	Trevorton, Pa.	70	Wilmot ³
Raymond Wren	Dornsife, Pa. (6)	48	Deister Concentrator ¹

*Includes contracts for installation of new preparation equipment in existing structures. Where more than one unit of preparation equipment was installed, the number, when available, is given in parentheses after the plant address.

¹SuperDuty No. 7 diagonal-deck coal-washing-table equipment. ²Two Wilmot Simplex jigs and two Hydrotators. ³Wilmot Hydrotator equipment. ⁴No. 16 Plat-O coal-washing table equipment. ⁵Wilmot Simplex jig equipment.

⁶SuperDuty No. 7 diagonal-deck coal-washing tables with the following number of revolving feed distributors: Equitable, 3; Harry E., 2, plus two Leahy screens; Oxford, 1, plus two Leahy screens; Sickler Estate, 1. ⁷Menzies cone separators. ⁸Wilmot hydroseparator equipment. ⁹Preparation plant including L-B specific-gravity separator. ¹⁰Wilmot Hydrotator and hydroseparator equipment. ¹¹Revolving feed distributor.

following dragline. More consideration was given to belt conveyors for handling deeper overburden.

Bank preparation in 1947 was characterized by development of two-level drills with positions for as many as three drilling units for simultaneous operation. Hole size was trending upward and the use of milisecond delay shooting staged a substantial advance. Automotive haulage maintained its leading position, with sizes of units again increasing. Rising interest in plain flat-bed trucks dumped by separate hoists was reflected in several installations. One advantage is elim-

ination of heavy hoisting mechanisms on the trucks themselves.

Development of cost-accounting systems especially adapted to outcrop stripping in the East and South also was a notable 1947 development.

PREPARATION

Emphasis was more than ever on mechanical cleaning in coal preparation in 1947. Contracts for straight screening and picking installations were again rather few in number. As in past years, many mechanical units went into existing plants to handle specific sizes, par-

ticularly in the anthracite region. Complete new plants aggregate a substantial total, however, with one having a contract rating of 2,000 tons per hour.

As in the past, also, a number of companies adopted combination wet-and-dry equipment, although much of the dry equipment was installed for screenings or other fine sizes. Top sizes in mechanical cleaning again reached 8 in. or more, although 3 to 6 in. was more common. Contracts were let for additional heavy-media plants, while activity continued in converting Baum-type jigs to heavy-medium units, using bone material found in the coal as the medium-forming material.

The practice of washing coarse coal and loading the fines raw was again evident in a number of installations in 1947. The year, however, witnessed a sharp acceleration in the trend toward mechanical cleaning of the fines in both the anthracite and bituminous industries. Along with other units, the bituminous industry, falling in line with anthracite practice, bought extensively of coal-washing tables for recovering and cleaning the finer grades. Cone separators, upward-current washers, launders and air-tables also were extensively employed for fine-coal cleaning, along with electrostatic separators and, in the anthracite region, flotation units and spiral concentrators for treating silt. Interest in new foreign-developed units, including the Dutch cyclone, presaged early installations.

With the growth in washing of fine sizes, increased attention was devoted to initial preparation of the feed, drying and water clarification. A screw-conveyor-type settling tank for presizing No. 5 buckwheat, for example, was reported to be effective in eliminating fines smaller than 48 to 60 mesh prior to cleaning in standard machines. Drying in 1947 was characterized by increased use of thermal units, including one new type brought out in the course of the year, as well as additional installations of centrifugal machines and filters. More and more operators went to closed-type water systems to prevent stream pollution and the practice of using a roughing filter and finishing up with a polishing unit for nearly complete clarification registered an increase. One company also reported good results from the use of a cyclone-type thickener to clean up and recover water from settling tanks.

Explosions Mar Safety Record

Six Major Explosions and Some Loss of Ground Elsewhere Make 1947 Only Third-Best Safety Year — Gains Indicated, However, in Coping With Falls of Roof and Face, Machinery and Electricity

By FORREST T. MOYER
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AN OTHERWISE CREDITABLE coal-mine safety record was marred by six major explosions in 1947. Despite these disasters and their resulting large loss of life, the 1947 safety record was the third best in the history of the industry. Sharply improved fatality experience in 1947 in such universal fields as falls of roof, machinery and electricity indicates an improvement in coal-mining safety.

Direct comparisons of mine safety in 1947 and 1946 may be made most reasonably through fatality frequency rates as a result of the great increase in tonnage in 1947. The rise from 592,507,000 tons in 1946 to 676,000,000 tons in 1947 resulted in a corresponding increase in exposure to mining hazards.

Estimates indicate that a total of 1,165 men were killed at work in bituminous, anthracite and lignite mines of the country in 1947. Although this was a greater loss of life than in 1946, the rate of 1.72 fatal injuries per million tons of coal mined in 1947 was only slightly higher than the all-time low of 1.64 in 1946. In 1944, when the production of coal was only slightly greater, the total loss of life was 1,298, or 133 above 1947, while the fatality rate was 1.90 per million tons. The 1947 fatality rate was virtually the same as that of 1945, when 1,079 men were killed in mining 632,551,000 tons of coal.

At bituminous and lignite mines combined, 990 men are estimated to have lost their lives in mining 619,000,000 tons in 1947. Although production was at or near record levels, the loss of life in 1947 was the ninth lowest per year since complete fatality statistics were first compiled in 1910. Fatalities in 1947 occurred at a rate of 1.60 per million tons mined. This was the second lowest annual rate in history and only slightly less favorable

than the record low of 1.50 fatalities per million tons in 1946.

Comparison with the fatality experience in 1944, when production was virtually the same as in 1947, indicates continued over-all improvement in mine safety. In 1944, 1,124 men were killed in bituminous and lignite mines, or 134 more than in 1947. Likewise, the 1944 fatality rate of 1.81 per million tons was appreciably higher than in 1947.

Of the total 1947 fatalities at bituminous operations, 908 occurred in underground workings, 35 in strippings and 47 at surface works associated with deep mines.

It is estimated that 175 men were killed in the mining and processing of Pennsylvania anthracite in 1947. Based upon a production of 57,000,000 tons of cleaned coal, these fatalities occurred at a rate of 3.07 per million tons. Although both the number and rate of fatalities in 1947 were the highest since 1943, they were the fourth lowest per year in the statistical history of the industry. However, the 1947 rate was appreciably above the rec-

ord low of 2.62 fatal injuries per million tons in 1945, when 174 men were killed. At anthracite operations, 155 of the fatalities in 1947 occurred in underground workings, 6 in strippings and 14 at surface works associated with deep mines.

Major Disasters

All six 1947 major disasters—those in which five or more men were killed in a single accident or explosion—were mine explosions. They claimed 179 lives. This loss of life was the second largest from major disasters since 1940, when 276 men were killed in six mine explosions.

Three of the major disasters in 1947 occurred in bituminous mines and killed 146 men. The first was in Centralia mine, Centralia, Ill., and killed 111 men. This disaster was the most serious since the explosion at Mather, Pa., May 19, 1928, which killed 195 men. The severity of the Centralia explosion resulted in public investigations from which beneficial mine-safety results should develop. The second 1947 disaster was an explosion in Spring Hill mine, near Terre Haute, Ind., in which eight men lost their lives. The third occurred July 24, in Old Ben No. 8 mine, West Frankfort, Ill., and killed 27 men.

The anthracite major-disaster record of 1947 was the worst in frequency and severity in many years. The three disasters were explosions occurring as follows: Nottingham mine, Plymouth, Jan. 15,

U. S. Coal-Mine Fatalities During 1947*

Cause and location	Bituminous		Pa. Anthracite		Total	
	Number of fatalities	Rate per million tons	Number of fatalities	Rate per million tons	Number of fatalities	Rate per million tons
Underground:						
Falls of roof and face	462	0.746	83	1.456	545	0.806
Haulage	195	0.315	18	0.315	213	0.315
Explosions: Local	7	0.011	2	0.035	9	0.013
Major	146	0.236	33	0.579	179	0.265
Explosives	21	0.034	8	0.140	29	0.043
Electricity	24	0.039	3	0.053	27	0.040
Machinery	24	0.039	...	...	24	0.036
Shaft	8	0.013	1	0.018	9	0.013
Miscellaneous	21	0.034	7	0.123	28	0.041
Total underground	908	1.467	155	2.719	1,063	1.572
Stripping or open-cut	35	0.056	6	0.105	41	0.061
Surface	47	0.076	14	0.246	61	0.090
Grand Total, 1947	990	1.599	175	3.070	1,165	1.723
Grand Total, 1946	800	1.504	174	2.876	974	1.644
Production, 1947 (est.)	619,000,000		57,000,000		676,000,000	
Production, 1946 (est.)	532,000,000		60,507,000		592,507,000	

*Estimated from nearly complete returns.

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15 men; Schooley mine, West Wyoming, April 10, 10 men; Franklin mine, Wilkes-Barre, Dec. 11, eight men. This was the largest number of disasters since 1926, when three explosions occurred. Moreover, the total of 33 men killed in major disasters in 1947 was the largest in any year since 1919, when 100 men lost their lives in two disasters. The 1947 disaster record emphasizes the need for constant vigilance in the control of explosion hazards. The anthracite industry had achieved a record of no disasters in the three preceding years and only one in the 8½ years preceding 1947.

Falls of Roof and Face

Roof and face falls are the leading causes of fatal injuries in coal mines each year. In 1947, they were responsible for 545 fatalities, or nearly half the year's total. However, the number of fatal injuries from this hazard in 1947 was slightly lower than in 1946. Moreover, the increased production helped reduce the rate to 0.81 deaths per million tons, which was appreciably lower than the corresponding rate of 0.93 in 1946, and probably the lowest annual rate on record.

In bituminous mines, it is estimated that 462 men lost their lives through falls of roof and face in 1947. The fatality rate was 0.75 per million tons, which was lower than the rate of 0.84 in 1946. The long-term improvement in controlling this hazard may be gaged by comparing the 1947 rate with the corresponding one of 1.36 in 1938.

At anthracite operations, the total of 83 men killed by falls of roof and face in 1947 was well below the 104 fatalities in 1946. The 1947 rate of 1.46 likewise was well under that of 1.71 in 1946. Continued improvement in controlling this hazard to the degree indicated by the 1947 statistics would have a marked effect upon the coal-mining safety record.

Haulage

Underground accidents caused by mine cars and locomotives killed 213 men in coal mines in 1947. This was 28 more than in 1946 but, as a result of increased production, the 1947 fatality rate of 0.32 per million tons was relatively unchanged from 1946. Haulage usually is the second major cause of fatal injuries underground.

In bituminous mines, the 1947 haulage-fatality record was slightly

less favorable than in 1946. The number of fatal injuries increased 31 over 1946 to an estimated total of 195 in 1947. The fatality rate was 0.32 per million tons in 1947, or only slightly higher than the 1946 rate. At anthracite operations, 18 men were killed in underground haulage, or three less than in 1946. However, the fatality rate of 0.32 was only a slight improvement over 1946.

Gas and Dust Explosions

Eleven gas and dust explosions caused loss of life in coal mines in 1947. Of these, six were major disasters and five were local explosions. In all, the explosions took 188 lives and the fatality rate was 0.28 per million tons in 1947, against 0.05 in 1946.

Three of the major explosions and four of the local explosions were in bituminous mines. The major explosions killed 146 men and the local explosions seven. The fatality rate for each class of explosions in 1947 was substantially higher than in 1946, when 27 men were killed in two major explosions and three in local explosions. At anthracite mines, three major explosions killed 33 men and one local explosion two. There were no major explosions in 1946 and one local explosion killed two men.

Explosives

Although coal mines used about 275,000,000 lb. of explosives in 1947, only 29 of the 1,165 fatal injuries during the year were chargeable to their handling and use. This number does not include fatalities from mine explosions in which explosives may have been a contributing factor. As a direct cause of fatal accidents, explosives killed 21 men in bituminous mines and eight in anthracite mines. This explosives experience, as measured by respective rates of 0.03 and 0.14 fatalities per million tons, was less favorable than in 1946 in both anthracite and bituminous operations.

Electricity

Underground fatal accidents caused directly by electric current resulted in the deaths of 27 men in 1947—the same as in 1946. Of these fatal injuries, 24 occurred in bituminous mines at a rate of 0.04 per million tons. Because of the increase in bituminous output in 1947, this fatality record indicated an improvement in safeguards against electrical accidents. In

1946, 24 men were killed by electricity in bituminous mines, or at a rate of 0.05 per million tons mined. In underground anthracite mines, experience was slightly less favorable in 1947 than 1946. Three men were killed by electricity each year, but the 1947 rate of 0.05 per million tons was slightly higher than in 1946.

Machinery

The notable progress in safe operation of mining machinery that was observed in 1946 continued through 1947. The total of 24 fatalities caused by machinery was four less than in 1946 and the fatality rate was reduced to 0.04 per million tons in 1947. All the fatalities from machinery operation in 1947 were in bituminous mines. The rate was 0.04 per million tons, compared to 0.05 in 1946, when 27 men were killed by machinery. No fatalities were caused by machinery operation in anthracite mines in 1947, whereas this hazard was responsible for one man losing his life in 1946.

Other Causes

Of the total coal-mine fatalities in 1947, nearly 90 percent resulted from the principal causes previously discussed. The remaining 139 fatalities resulted from a variety of relatively minor causes in underground work, in stripping operations and in surface work at mines. Safety at bituminous strippings apparently lost ground in 1947, when 35 men (13 more than in 1946) lost their lives at these operations. In anthracite strip mines, six men were killed in 1947, compared to nine in 1946. In surface works associated with deep mines, 61 men were killed at work. Of these fatalities, 47 were at bituminous mines and 14 at anthracite.

Non-Fatal Injuries

A tentative total of 63,000 non-fatal lost-time injuries is estimated to have occurred at all coal mines in 1947, or at a rate of 93.20 per million tons mined. At bituminous mines, the estimated total of 51,000 non-fatal injuries represented a rate of 82.39 per million tons. The tentative total of 12,000 non-fatal injuries at anthracite operations in 1947 is estimated to have occurred at a rate of 210.53 per million tons. These estimates of non-fatal injuries may be materially revised as detailed data and reports are received from coal-mining companies.

Sales of Loaders and Cleaners

New Bituminous Loading and Cleaning Record Set in 1947 — Anthracite Equipment Purchases Dropped, Although Tonnage Mechanically Handled Rose in 1946— "Mother" Conveyors and Shuttle Cars Gain

By W. H. YOUNG, Chief, and R. L. ANDERSON, Assistant Chief
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SHIPMENTS of mechanical-loading equipment for underground use in coal mines in the United States, in terms of capacity, were 16 percent less in 1947 than in 1946. The capacity of mechanical-cleaning equipment sold for use at bituminous-coal mines was 4 percent less. Shipments of "mother" conveyors and shuttle cars increased 9 and 15 percent, respectively.

This survey was made possible by the courteous cooperation of all known manufacturers of mechanical-cleaning equipment for bituminous coal and of mechanical-

loading and supplementary haulage equipment for use in all coal mines in the United States. Data from various trade journals also were utilized.

Mechanical-loading units and supplementary haulage equipment "sold in 1947" represent shipments made during 1947. Only a small percentage of the mechanical-cleaning equipment sold in 1947 was placed in operation during the year. The remainder will be installed in 1948 and 1949.

Mechanical Loading

Bituminous coal and lignite mechanically loaded in underground

mines decreased from 262,512,729 tons in 1945 to 245,340,768 tons in 1946. However, the percentage of the total underground output so loaded rose from 56 in 1945 to 58 in 1946. Mechanical loading in Pennsylvania anthracite mines increased from 13,927,955 tons in 1945 to 15,619,162 tons in 1946, carrying the percentage of the total underground output so loaded up from 40 to 41 percent.

Data on bituminous-coal and lignite production by methods of mining and mechanical cleaning for 1945-47, inclusive, are given in Table I. Preliminary estimates for 1947 indicate that it was a record year for mechanical loading, strip mining and mechanical cleaning. The previous high for mechanical loading and cleaning was in 1944.

Types of Units Sold—Table II gives the number of mechanical-loading units sold to bituminous, anthracite and lignite producers in the United States for use in underground mines in the years 1940-47, inclusive. Sales of mobile loaders and conveyors decreased 1.8 and 14.7 percent, respectively, from 1946 to 1947, while the num-

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Table I—Bituminous Coal and Lignite Production in the United States by Methods of Mining and Mechanical Cleaning, 1945-47, Inclusive

	1945		1946		1947*	
	Thousands of net tons	Percent of total	Thousands of net tons	Percent of total	Thousands of net tons	Percent of total
Surface stripping	109,987	19.0	112,964	21.2	135,000	21.8
Hand loaded underground	205,118	35.5	175,617	32.9	199,000	32.2
Mechanically loaded underground	262,512	45.5	245,341	45.9	285,000	46.0
Total production	577,617	100.0	533,922	100.0	619,000	100.0
Mechanically cleaned	147,886	25.6	138,670	26.0	160,000	25.8

*Preliminary.

Table II—Units of Mechanical Loading Equipment Sold to Bituminous-Coal, Anthracite and Lignite Mines for Underground Use in the United States, as Reported by Manufacturers, 1940-47, Inclusive

Type of equipment:	1940 1941 1942 1943 1944 1945 1946 1947 1947 from 1946								
									Percent change, 1947 from 1946
Mobile loaders	233	368	352	234	286	359	495	486	- 1.8
Scrapers ¹	39	11	29	15	39	26	35	35	.....
Conveyors ²	1,762	2,130	1,491	1,100	708	861	1,157	987	-14.7
Pit-car loaders	3	10	2	1	.....	.....	.....	.....	.....
Total, all types.....	2,037	2,519	1,874	1,350	1,033	1,246	1,687	1,508	-10.6
Number of manufacturers reporting	32	32	28	24	22	25	24	23	.....

¹Reported as scrapers or scraper haulers and hoists.

²Includes hand-loaded conveyors and those equipped with duckbills or other self-loading heads. Sales of both loading heads and conveyors were counted for the years 1940 and 1941, but the figures for 1942-47, inclusive, do not include loading heads separately.

³Canvass of sales of pit-car loaders discontinued in 1945.

Table III—Total Number of Units of Mechanized Loading Equipment Shipped for Use in Each State in 1947

State	(L—Mobile loading machines; S—Scrapers; C—Conveyors)	
	Number of units of all types shipped in 1947	Types of equipment in approximate order of capacity
Bituminous and lignite mines:		
Alabama	87	L.C.
Arkansas	2	C.
Colorado	12	C.L.
Illinois	29	L.C.
Indiana	10	L.
Iowa	3	L.
Kentucky	187	L.C.S.
Maryland	4	C.L.
New Mexico	3	L.C.
North Dakota	1	L.
Ohio	58	L.C.
Pennsylvania	266	L.C.S.
Tennessee	34	L.C.
Utah	27	L.C.
Virginia	69	L.C.
West Virginia	146	L.C.S.
Wyoming	5	L.C.
Total bituminous and lignite.....	1,343	L.C.S.
Pennsylvania anthracite mines....	165	C.S.L.
Grand total	1,508	L.C.S.

Table IV—Sales of Mechanical Loading Equipment in 1947 Compared with Total Number of Machines in Active Use in Preceding Years

	Number of machines in active use, as reported by mine operators—							Number of machines sold, as reported by manufacturers in 1947
	1940	1941	1942	1943	1944	1945	1946	
Bituminous and lignite mines:								
Mobile loading machines.....	1,720	1,985	2,301	2,525	2,737	2,950	3,200	485
Scrapers	116	109	93	83	87	87	75	12
Pit-car loaders	697	607	481	321	241	142	93	... ¹
Conveyors equipped with duckbills or other self-loading heads	656	788	1,062	1,226	1,331	1,383	1,521	... ²
Hand-loaded conveyors, number of units....	2,263	2,807	3,041	3,191	3,236	3,385	3,470	846
Anthracite mines (Pennsylvania):								
Mobile loading machines.....	... ³	... ³	... ³	5	12	20	27	1
Scrapers	547 ³	505 ³	524 ³	510	491	548	564	23
Pit-car loaders .....	...⁴	... ⁴	... ⁴	... ⁴	... ⁴	... ⁴	... ⁴	... ¹
Conveyors equipped with duckbills or other self-loading heads .....	...⁴	... ⁴	... ⁴	... ⁴	... ⁴	... ⁴	... ⁴	... ²
Hand-loaded conveyors, number of units....	2,189 ⁴	2,432 ⁴	2,491 ⁴	2,701 ⁴	2,807 ⁴	3,006 ⁴	3,233 ⁴	141

¹Canvass of sales of pit-car loaders discontinued in 1945.

²Sales of conveyors equipped with duckbills or other self-loading heads are included with hand-loaded conveyors.

³Mobile loading machines are included with scrapers.

⁴Pit-car loaders and conveyors equipped with duckbills or other self-loading heads are included with hand-loaded conveyors.

Table V—Comparison of Mechanical Loading Equipment and "Mother" Conveyors in Actual Use in 1946 with Sales Reported in 1947, by States

State	Mechanical-loading equipment—						"Mother" conveyors ²
	Mobile loaders		Scrapers		Conveyors ¹		
	In use in 1946	Sales in 1947	In use in 1946	Sales in 1947	In use in 1946	Sales in 1947	
Bituminous and lignite mines:							
Alabama	112	24	37	....	384	63	5
Arkansas .....	....	....	....	....	63	2	1
Colorado	30	1	1	....	283	11	1
Illinois	582	24	....	....	30	5	6
Indiana	146	10	....	....	....	....	8
Iowa	4	3	....	....	22	....	1
Kentucky	289	71	1	3	621	113	31
Maryland	1	1	....	....	43	3	....
Michigan .....	....	....	....	....	5	....	....
Montana	47	....	....	....	8	....	....
New Mexico	16	2	6	....	1	1	....
North Dakota	6	1	....	....	....	....	....
Ohio	162	28	....	....	166	30	23
Oklahoma	4	....	....	....	55	....	....
Oregon .....	....	....	....	....	2	....	....
Pennsylvania	693	93	17	5	893	168	26
Tennessee	11	8	....	....	168	26	5
Utah	80	10	....	....	117	17	....
Virginia	83	26	....	....	158	43	3
Washington	1	....	5	....	96	....	....
West Virginia	903	182	....	4	1,564	360	90
Wyoming	30	1	8	....	313	4	....
Total bituminous and lignite	3,200	485	75	12	4,991	846	200
Anthracite Mines							
Pennsylvania	27	1	564	23	3,233 ³	141	4
Grand total	3,227	486	639	35	....	987	204

¹Includes hand-loaded conveyors and conveyors equipped with duckbills or other self-loading heads.

²Includes all haulage conveyors with capacity over 500 ft. except main slope conveyors. Data on number in use in 1946 are not available.

³Includes pit-car loaders and duckbills or other self-loading conveyors.

ber of scraper units was 35 in each year.

Total Sales by States—Table III gives the number of mechanical-loading units shipped to various states in 1947. Types of equipment shipped are indicated by letter symbol in approximate order of capacity. Of the total units

shipped, mobile loading machines (indicated by "L") contributed the largest addition to capacity, followed by conveyors ("C") and scrapers ("S"). Capacities are based on 1946 records of actual performance, as reported by mine operators. In 1947, 1,343 mechanical-loading units of all types were

shipped to bituminous and lignite mines, an increase of 12 over the 1946 total of 1,331. Total units shipped to Pennsylvania anthracite mines decreased from 356 in 1946 to 165 in 1947, or 54 percent.

Mechanical-loading equipment exported in 1947, in terms of capacity, aggregated 19 percent of the shipments to United States mines. This compares with 11 percent exported in 1946.

Types of Loading Equipment Sold Compared With Units in Use

The trend in demand for various types of mechanical-loading equipment is shown in Table IV. At bituminous and lignite mines, three loading devices (mobile loaders, self-loading conveyors and hand-loaded conveyors) have gained tremendously in number in use from 1940 to 1946. Use of the other two types (scrapers and pit-car loaders) has decreased in the same period.

Shipments of mobile loaders to bituminous and lignite mines decreased from 490 in 1946 to 485 in 1947. Scrapers rose from 3 to 12 and conveyors from 838 to 846 in the same period. The total number of mechanical-loading units of all types in use in Pennsylvania anthracite mines rose from 2,736 in 1940 to 3,824 in 1946, or 40 percent, compared with a 53-percent increase at bituminous and lignite mines in the same period. Shipments of mobile loaders to Pennsylvania anthracite mines decreased from five in 1946 to one in 1947; scrapers from 32 to 23; and conveyor units from 319 to 141.

Types of Equipment Purchased by States—Table V gives the number of mobile loaders, scrapers

and conveyor units shipped into the various states in 1947 and the number in use in 1946. West Virginia continued to receive the greatest number of mobile loaders, followed, in the order named, by Pennsylvania, Kentucky and Ohio. West Virginia also received the most conveyor units, followed by Pennsylvania, Kentucky and Alabama. Scrapers were shipped to three states in 1947. Pennsylvania anthracite mines received 23 units; Pennsylvania bituminous, 5; West Virginia, 4; and Kentucky, 3. Conveyor units shipped to Pennsylvania anthracite mines decreased from 319 in 1946 to 141 in 1947, or 56 percent.

Haulage Equipment

"Mother" Conveyors—For the purpose of this study, a "mother," or haulage, conveyor is defined, as a sectional, extensible, power-driven conveying unit that can handle over 500 ft. of conveyor. Main-slope conveyors are excluded.

Sales of "mother" conveyors were included in this survey for the first time in 1945, with 142 sales reported. In 1946, sales increased to 187, advancing further to 204 units in 1947. No capacity estimates have been made for these "mother" conveyors and they are not included in the summaries of mechanical-loading equipment.

Trackless Gathering Equipment

—Sales of shuttle cars, or rubber-tired self-powered haulage units, increased 15 percent in 1947 over 1946. Shipments were made to 12 states in 1947. West Virginia received the largest number, followed by Kentucky, Pennsylvania and Alabama. During 1946, 25 percent of the total bituminous coal and lignite loaded by mobile loaders was handled by shuttle cars and 4 percent was loaded onto conveyors. The remainder of the mobile-loader tonnage (71 percent) was loaded directly into mine cars.

Table VI gives the number of mobile loaders in use in bituminous and lignite mines, by states and types of loading, in 1945 and 1946. The total of mobile loaders in use increased from 2,950 in 1945 to 3,200 in 1946, or 8 percent, while the number loading into rubber-tired trucks or shuttle cars rose from 579 to 726, or 25 percent. Since each mobile loader requires one to three shuttle cars, it follows that approximately 1,500 shuttle cars were used in bituminous and lignite mines in 1946.

Table VI—Number of Mobile Loaders in Use in Bituminous-Coal and Lignite Mines, by Types of Loading, in Each State, in 1945 and 1946

State	Number of mobile loaders—						Total number in use	
	Loading direct into mine cars		Loading onto conveyors		Loading into rubber-tired trucks			
	1945	1946	1945	1946	1945	1946	1945	1946
Alabama	27	24	51	58	25	30	103	112
Colorado	12	10	1	1	21	19	34	30
Illinois	454	453	26	28	90	101	570	582
Indiana	117	106	....	....	43	40	160	146
Iowa .....	....	....	3	4	....	....	3	4
Kentucky	143	156	9	10	85	123	237	289
Maryland .....	....	....	....	1	....	....	....	1
Montana (bit. and lig.).....	45	43	....	....	4	4	49	47
New Mexico	10	12	....	....	2	4	12	16
North Dakota (lignite).....	4	6	....	....	3	....	7	6
Ohio	115	117	31	17	28	28	174	162
Oklahoma .....	....	....	4	4	....	....	4	4
Pennsylvania (bituminous)..	481	494	40	43	130	156	651	693
Tennessee	2	4	....	....	9	7	11	11
Utah	48	55	11	11	8	14	67	80
Virginia	71	73	2	3	5	7	78	83
Washington	1	1	....	....	....	....	1	1
West Virginia	625	689	17	27	122	187	764	903
Wyoming	21	24	....	....	4	6	25	30
Total	2,176	2,267	195	207	579	726	2,950	3,200

Table VII—Bituminous Coal Cleaned in 1946 and Capacity of Equipment Sold in 1947, in the United States, by Types of Equipment¹

Type of equipment	Number of plants in operation ²	1946		Annual capacity of equipment sold in 1947 ³ (net tons)
		Net tons of cleaned coal ²	Percent cleaned by each type	
Wet methods:				
1. Jigs	226	64,702,238	46.7	....⁴
2. Concentrating tables	10	1,447,200	1.0	....⁴
3. Classifiers	68	13,883,088	10.0	....⁴
4. Launderers	18	16,020,328	11.6	....⁴
5. Dense-Media	59	14,172,428	10.2	....⁴
6. Jigs and concentrating tables	14	3,776,190	2.7	....⁴
7. Other combinations of Methods 1, 2, 3, 4 and 5	21	8,057,167	5.8	....⁴
Total wet methods.....	416	122,058,639	88.0	28,680,000
Pneumatic methods	88	16,611,198	12.0	960,000
Grand total	504 ⁵	138,669,837	100.0	29,640,000

¹A small percentage of the equipment sold in 1947 was placed in operation during the year and the remainder will be placed in operation during 1948 and 1949.

²Includes plants operated by consumers at central washeries in Colorado and Pennsylvania.

³Based on 214 days (average days mines were active in 1946) and eight hours per day.

⁴Included under "Total wet methods."

⁵Includes a duplication of 59 plants using both wet and pneumatic methods; deducting this duplication gives a net total of 445 plants that cleaned coal in 1946.

Mechanical Cleaning

Reports from 18 manufacturers of bituminous coal-cleaning equipment show that sales were made in nine states in 1947. The total capacity of sales in 1947 was 17,300 tons of cleaned coal per hour, against 18,000 tons sold in 1946.

Table VII gives data on bituminous coal cleaned in 1946, by type of equipment in use, and the annual capacity of equipment sold in 1947. For comparative purposes, the annual capacity of 1947 sales is based on the average number of days mines were active in 1946. However, only a small percentage of the cleaning equipment sold in 1947

was placed in operation in that year. The remainder will be installed in 1948 and 1949.

The capacity of all types of equipment sold in 1947 for cleaning coal by wet methods was equivalent to 24 percent of the bituminous coal so cleaned in 1946, while the capacity of pneumatic equipment sold in 1947 was 6 percent of the pneumatically cleaned tonnage in 1946.

In terms of capacity, the ratio of sales of new cleaning plants to additions or replacements of present plants remained the same in 1947 as in 1946, or two-thirds new plants and one-third additions or replacements.



LOOKING EAST ALONG THE AXIS of the basin at the Logan stripping. Scrapers and trucks with overburden

Tandem Units Boost

Scrapers, Shovel, Trucks and Dragline Handle Definite Layers of Overburden Totaling Up to 160 Ft. at Bazley Anthracite Stripping—Dragline Also Removes and Stockpiles Coal—Plugs Protect Holes Drilled Ahead of Dragline

By RALPH R. RICHART
Associate Editor, Coal Age

SCRAPERS, a shovel and eight trucks and a walking-type dragline, all working in tandem, remove definite areas of overburden at the Logan anthracite stripping of J. Robert Bazley, Inc., near Centralia, Columbia County, Pa. Scrapers remove the first 12 to 15 ft. of the top soil and gravel and deposit it on the spoil bank, which also is the back fill for the area just



PROFILE OF LOGAN STRIPPING showing how the dragline uses overburden to back fill



ply the road on the right. Coal is trucked from the stockpiles to the field tippie over the roadway on the left.

Dragline Efficiency

stripped. The next layer or bench, consisting of approximately 30 ft. of hard pan, is loaded into dump trucks by a shovel and hauled to the spoil dump. The remainder of the overburden, as much as 110 ft. in the deepest part of the basin and consisting largely of sandstone, is blasted and cast as back fill by the dragline. Coal thus uncovered is removed and stockpiled by the same

dragline one cut ahead of the pit.

The basin or syncline where the Mammoth vein is being stripped is approximately 800 ft. wide and 4,500 ft. long (originally). Cover for the 25-ft. vein, at the deepest point, is about 160 ft. The axis of the basin lies on an east-and-west line, and one cut has been taken along the south crop line by a previous stripping contractor. Spoil

from this cut was cast over the basin area.

Overburden yardage for the present operation, which was begun in March, 1947, is estimated to be 9,502,000 cu.yd. Approximately 600,000 cu.yd. represents the spoil cast from the cut taken along the outcrop. It, of course, must be handled again. Ratio of overburden, in cubic yards to be moved to tons of



each preceding 50-ft. cut. Scrapers and trucks are building new spoil bank on the left.

RUBBER-TIRED EQUIPMENT SERVES LOGAN



TRACTOR ASSISTS the scraper during the loading operation. The "stinger" on the back of the tractor is used to pull some of the scrapers during the loading operation.



SCRAPER DUMPING on the run at the spoil dump. Each operator is responsible for servicing his unit at the beginning of the shift. The units are operated two shifts a day.



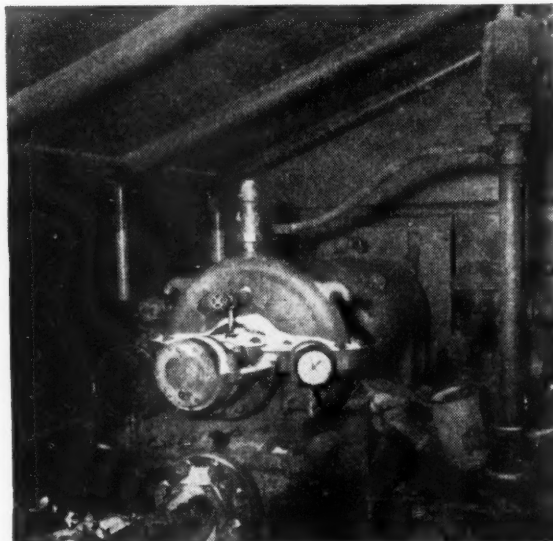
TRUCKS HAVE THIS 8-PERCENT GRADE to negotiate as they leave the pit. Capacity of trucks is 10 cu.yd.

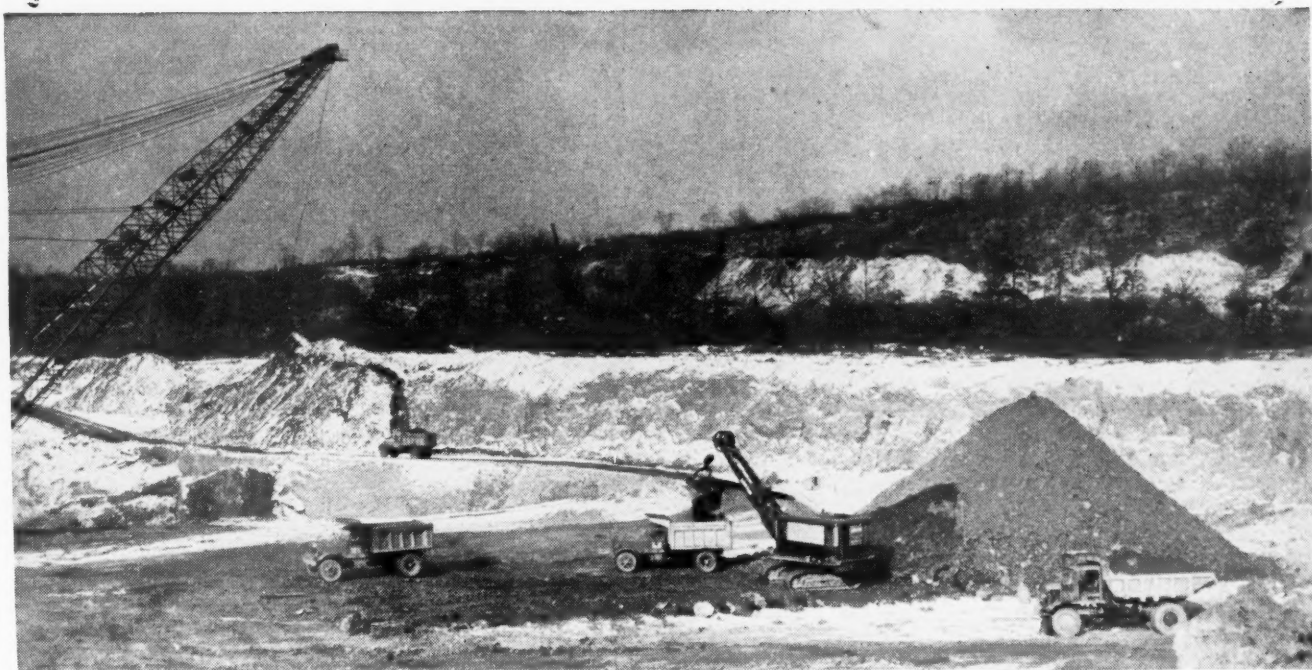


PORTABLE AIR COMPRESSOR used to operate air drills when boulders are encountered in the overburden.



A SHORT SUCTION LIFT is maintained on this pump, built for any position, by lowering the truck along the bottom rock.





SIX 14-TON TRUCKS haul the raw run-of-mine coal from the stockpile to the field tippie.

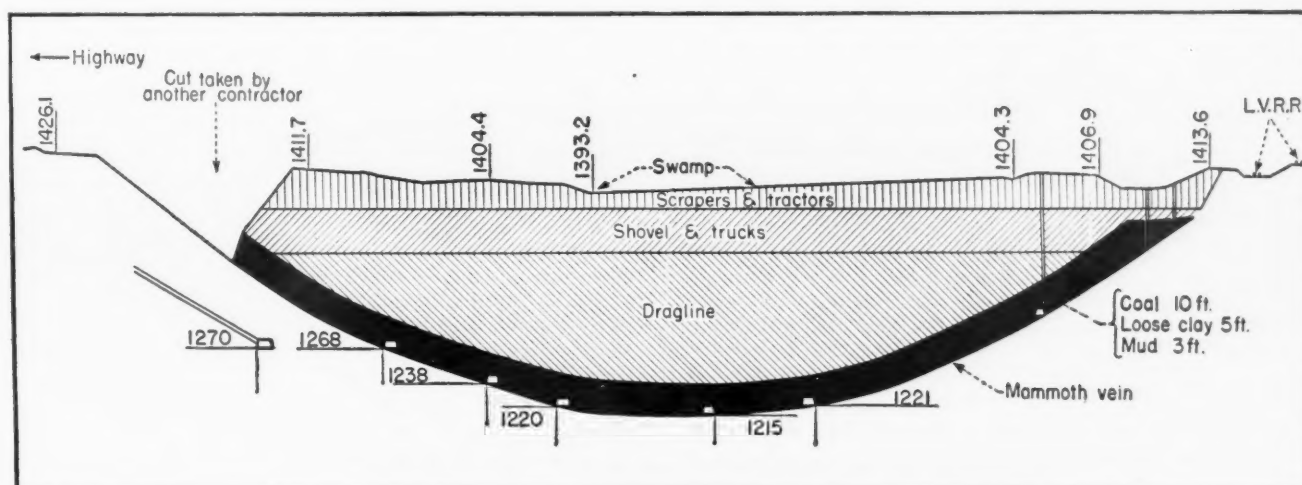


FIG. 1—TYPICAL PROFILE SECTION of the Mammoth vein basin at the Logan stripping.

coal to be recovered, is estimated at 7.6:1. In this basin, the Mammoth vein has been deep-mined to the extent that only about 50 percent of the original vein is available for recovery through stripping.

A study of the project was made before the Bazley organization attempted stripping this area for the Susquehanna Collieries Division of the M. A. Hanna Co., Nanticoke, Pa. As the area is sandwiched between a three-lane highway and a railroad, casting room is restricted. There was no room for recasting such as would be needed in throwing all the spoil to one side parallel to the basin. Even where there is room to be had, the Bazley organization has found that there is an economic limit to recasting, which is determined by such factors as:

(1) average depth of dragline removal; (2) nature of the material handled; (3) the distance of removal, or the number of recasts. If too much depth of pit and height of bank are encountered in casts and recasts with draglines, it may be advisable to make a study of costs of shovel-loading and truck-haulage vs. dragline operation. Results of the Logan study showed that removal of the overburden could be effected by scrapers, shovel and truck haulage and the remainder by one cast with a dragline, with the dragline handling all of the rock and also removing and stockpiling the coal.

Management at Bazley reasons the allocation of the overburden assignments between the various excavating units as follows. Scrapers,

assisted by tractors (bulldozers) in loading, because of their mobility and speed, are well suited for the task of removing the top 12- to 15-ft. layer of the loose overburden. Thus they operate in material easily loaded and over roads free of steep grades. On a level road, they easily outrun the end-dump trucks on this job.

Since the end-dump trucks can negotiate 8-percent grades without much difficulty, it is feasible to remove the next 35-ft. layer of the overburden, consisting mostly of hard pan, by shovel and trucks. Both methods of handling the overburden—scrapers, and shovel and trucks—provide an economical means of transporting the spoil behind the pit where the coal is being removed. In this instance, the back-



MINOR REPAIRS are made to trucks and scrapers at this two-stall field repair station. Major repairs, engine overhauling, etc., are handled at the Bazley shops at Port Carbon.



THE 3 1/2-YD. shovel loading one of eight 10-cu.-yd. trucks hauling overburden from the basin area.

filling method is about the only logical means available for spoil disposal.

Removing two shelf-like sections of the overburden, totaling 50 ft., before the dragline goes to work eliminates much hoisting work and results in better balance of the dragline cycle. Experience has convinced the Bazley engineering staff that draglines become only hoisting machines at depths greater than 65 percent of their boom length. On this basis, the economical hoisting limit for best efficiency for a dragline with a 200-ft. boom would be 130 ft. Wherever possible, drag-

lines, in their opinion, should not be used to dig at greater depths than 50 to 60 percent of their boom length.

Before starting the present operation, a 4-ft. ditch was dug around the perimeter of the basin to divert surface water draining into the area. Old underground workings also were dewatered. When fresh seepage from those workings threatens to interfere with pit operations, a 750-g.p.m. 200-ft.-head Barrett-Haentjens pump, with priming protection, is used to dewater the pit. The unit is mounted on a pneumatic-tired

truck that can be lowered along the bottom rock. Since the pump is built to operate at any angle, there is no necessity for leveling it. The lift on the suction side can be adjusted by lowering the truck along the surface of the bottom rock.

Four scraper units consisting of three Super C LeTourneau Tournapulls with 225-hp. Cummins diesel engines pulling 12-cu.-yd. Model LP Carryalls, and a 14-cu.-yd. LaPlant-Choate unit operate over a 2,300-ft. route to load and transport the upper portion of the overburden to the spoil area. One TD-18 International tractor with 12-ft. Bucyrus-Erie blades facilitates the loading of these scrapers, either by pulling or pushing. Between trips, this tractor, along with another International that cleans up around the shovel, loosens the material for quicker loading of the next scraper or grades the roadway. At the dump, the scrapers remain well back from the edge of the spoil pile where the footing is firm and where they can discharge their load without sacrificing too much speed. These units have bright headlights and operate two shifts a day. Each scraper operator is responsible for servicing his unit at the beginning of the shift.

The shovel and truck-haulage equipment used to move the intermediate portion of the overburden (35 ft. of hard pan) consists of: (1) a 3 1/2-cu.-yd. Model 1201 Lima shovel powered by a 225-hp. Cummins diesel; (2) seven 10-cu.-yd. Euclid trucks powered by 150-hp. Cummins diesels; and (3) a 10-cu.-yd. Mack truck powered by a 200-hp. Cummins diesel. At present, the maximum grade out of the



RIGHT TO LEFT: Peter Ambrose, general foreman at Logan stripping, and C. A. Coddington, night foreman.



LEFT TO RIGHT: Dan Rengier, assistant secretary; Patrick Dennery, superintendent; and Albert Carter, transportation superintendent.

pit is 8 percent, but it is soon to be cut to 4 percent. One man supervises operations at the shovel and keeps the trucks properly spaced along the 2,300- to 2,500-ft. haulage route.

Improvements in design, notably greater body and frame capacities, and bigger tires capable of absorbing greater impact loads, have resulted in trucks that are better able to stand the impact of 3- to 8-ton loads dropped from a height of 5 or 6 ft. Also, trucks with multiple rear wheels provide better flotation and low bearing pressures for close approach to the edge of the spoil bank.

A spotter on the spoil dump spots the trucks for dumping. A D-7 Caterpillar tractor, equipped with blade, smooths off the spoil bank, particularly where the scrapers discharge their loads. Trucks and scrapers hauling spoil material operate two shifts a day.

A Model 42-T 9-in. Bucyrus-Erie well drill advances ahead of the 9-cu.yd. Marion 7400 walking-type dragline on the third and last overburden level. Nine-inch holes are drilled across the basin on 22-ft. centers with an interval of 50 ft. between rows. The rock is primarily sandstone and the holes are drilled to the coal. Since the pit is advanced in 50-ft. intervals, each new row of holes becomes the next rib line.

As the dragline has to have solid footing under its tub-like base for satisfactory operation, and since it necessarily must follow the drill, the walls of the freshly-drilled holes have to be protected. As each hole is completed, a mushroom-shaped plug, made by welding a 4-ft. section of 10-in.-diameter pipe to a

36-in.-diameter $\frac{3}{8}$ -in.-thick steel plate, is inserted. These plugs do a good job of protecting the holes while the dragline is working on top of them.

Explosive consumption averages 0.5 lb. per cubic yard of overburden moved. American Cyanamid 40-percent ammonia dynamite and Ensign-Bickford Primacord fuse is used. Explosive charge per hole varies from 1,000 to 1,500 lb. The holes are charged and fired as needed, usually not more than two or three to each move of the dragline.

The 4,000-volt General Electric-equipped dragline is operated 21 $\frac{3}{4}$ hours every day by three crews. Blasting operations are scheduled to provide sufficient rock work for all night operations, leaving the daylight hours for recovering the coal and also removing rock when coal loading, limited to the day shift, cannot be done. Operating from the third level, the dragline does not hoist the rock more than 85 ft., on an average, before it swings and casts the spoil in the previous 50-ft. cut. Casting the spoil into the last cut means that the machine never swings more than 90 deg. when handling rock. Total overburden moved at the operation in October, 1947 (26 operating days), aggregated 257,000 cu.yd.

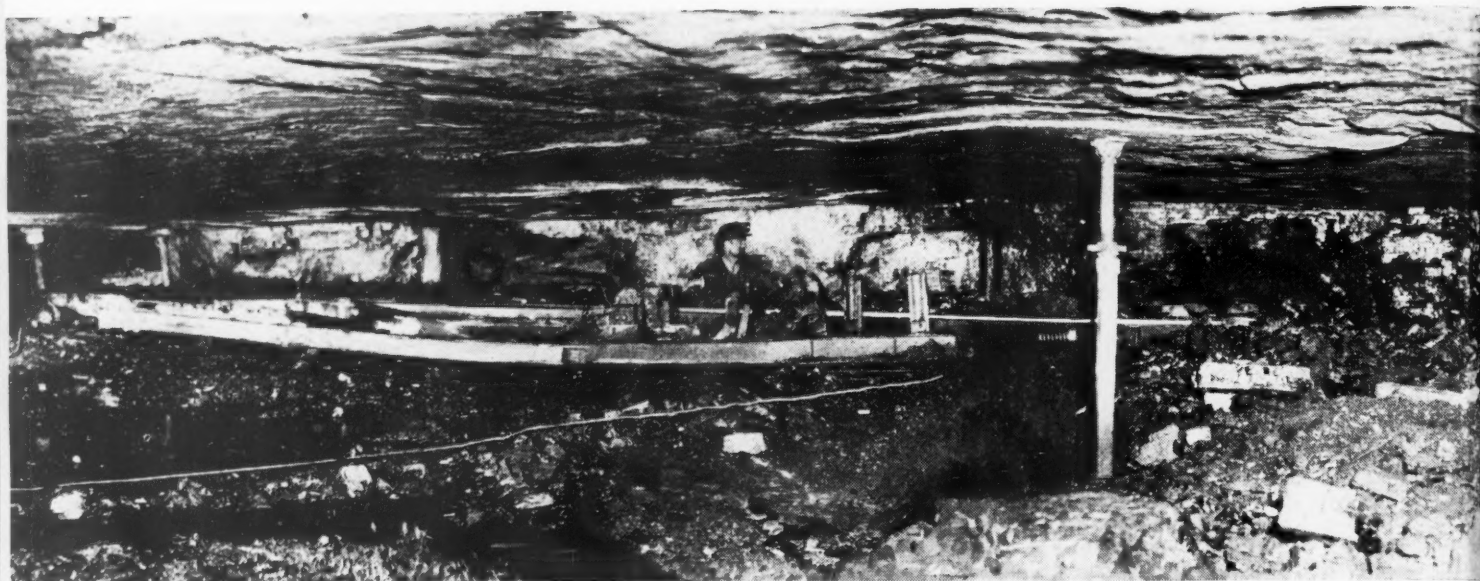
Coal is recovered with the dragline on the day shift, when it is easier to separate the coal from the rock. Stockpiling the coal as it is recovered from the pit makes it unnecessary to match the dragline's capacity with any haulage layout. Likewise, the coal-loading facilities are entirely divorced from the coal-recovery operations in the pit. Ap-

proximately 6,000 tons of coal are stockpiled over the area. It is being loaded out as the railroad-car supply permits.

A 2-cu.yd. Model 80 Lorain shovel, powered by a 175-hp. Waukesha-Hesselman diesel engine, loads coal 7 $\frac{1}{4}$ hours a day from the stockpile nearest the dragline. Six 14-ton Sterling dump trucks (two gas, four diesel) haul the coal to a field tippie about a mile away, where the 6-in. rock is picked out by hand on a picking table before the coal is loaded into railroad cars. The final preparation of the coal takes place at the Glen Burn breaker of the Susquehanna Collieries Co. Refuse in the raw run-of-mine coal, as it comes from the pit, is about 30 to 35 percent.

Minor repairs to scrapers and trucks are made at the two-stall field repair shop. Major repairs, engine overhauling, bit forging, etc., are handled at the Bazley shops at Port Carbon. Standard Oil fuels and lubricants are used exclusively at the Logan operation.

Officials of the J. Robert Bazley, Inc., with headquarters at the shops at Port Carbon, Pa., are: J. Robert Bazley, president and treasurer; Alfred Day, secretary; Harry H. Hughes, general superintendent; James R. Bazley, Jr., assistant general superintendent; Albert Carter, transportation superintendent; and Henry A. Ludwig, electrical engineer. In the operating department at the mine are: Patrick Dennery, superintendent, Logan and Germantown strippings; Peter Ambrose, general foreman; C. A. Coddington, night foreman; Thomas Moser, head mechanic; and Bernard Shearn, chief clerk.



POWER DUCKBILL on the job in a 40-ft.-wide room. With power swing, operation of the unit is a one-man job.

Mining With Power Duckbills

Power-Operated Units Increase Productivity per Man in 42-In. Coal—Cycle Provides up to 3½ Cuts 40 Ft. Wide per Shift with Three-Man Crew — Bugbusters Help

By KENNETH SNARR

General Superintendent, Williams Coal Co., Mannington, Ky.

THE IDEAL SYSTEM for moving coal from the face to the discharge point, no matter how far away it may be, is one that assures a steady

flow at all times with a minimum expenditure and at the highest possible tonnage rate.

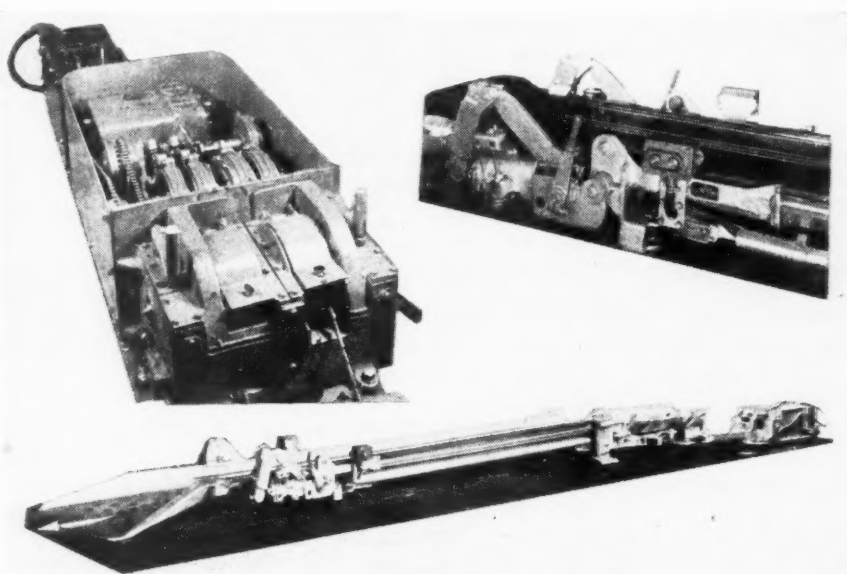
Concentration of the working

places is important. Wide working places and long cutter-bars are desirable. Adequate educated supervision is necessary. Wide rooms and long cutter-bars produce more coal than narrow places with short bars. If working places are close together, the time and work of moving is lessened.

In any loading system there must be a suitable loading machine at the face. The equipment used for transporting the coal from the loading machine to the entry should provide continuous uninterrupted serv-



SUPPLIES ARE distributed in the territory by pony and sled.



LOW-TYPE DUCKBILL 21 in. high for use in coal as thin as 30 in. At the upper left is the electric hoist; upper right, pushbutton controls and operating levers.



CUTTING MACHINES are equipped with power bugdusters.



PETE JOHNSON (left) and Leonard Clark drill a hole.

ice. Waiting for cars or other similar delays means loss of tonnage. Suitable equipment to transfer the coal to mine cars or belts prevents spillage and lost time.

Continuous flow of coal from the roomneck requires adequate haulage equipment, with plenty of cars or a belt of suitable capacity and speed to handle maximum loads. An even flow of coal onto a belt is desirable rather than intermittent high-speed loading, which requires fast belts to take the coal without spillage. High speed means shorter belt life.

Room Efficiency Increased

These and other factors leading to maximum efficiency were considered in selecting the equipment for the Williams mine—a slope operation at Mannington, Ky., sunk in 1940 and recovering the Kentucky No. 6 seam averaging 42 to 44 in. in thickness. The top varies from good to bad, while the bottom—damp to wet—is hard. The mine originally was equipped with Goodman Type E duckbills, G-20 drives, mother belts and corresponding auxiliary equipment to satisfy the several conditions previously listed. With the advent of the power duckbill—offering the advantages of additional productivity through power manipulation of the loading head—steps were taken to install it to raise efficiency in room work. Four such units—Goodman Type 277—were put in service in September and October, 1946, replacing the original equipment in room mining. Two additional power duckbills will be added to the equip-

ment used at Williams mine, making the totals six of each, with the Type E units restricted to entry driving.

No change in the mining system originally employed was made when the power duckbills were installed. However, the size of the crew was reduced from four men with the Type E duckbill to three with the Type 277 power-operated unit. In 40-ft.-wide rooms three men with a power duck will average 3 to 3½ cuts—the same as four men used to produce with the other machine. Output per man, depending upon roof conditions, varies from 20 to 50 tons per shift with the power duckbill, and a three-man crew has loaded as high as 155 tons in a 6½-hour face shift. With a power duck double-shifted a room 340 ft. deep is worked out in about six days.

The additional productivity possible with the power duckbill grows out of the fact that the shovel trough can be swung through a 90-deg. angle by power. No “bar-ring over” by hand, as with earlier duckbills, is necessary.

When a place is cleaned up the power duckbill can be pulled toward the face by power. Power for all movements is self-contained in the machine. It is a loading device that picks up the coal in a continuous stream in headings or rooms up to 50 ft. wide. To extend or retract the shovel all that is necessary is to move a lever from one position to another. A third position locks the shovel trough to the shaker-conveyor system in moving the coal through the duckbill. It is not necessary to hold the lever in any po-

sition. Two pushbuttons control the lateral, or sweep, movement. It is especially useful in low coal. The power duckbill with an over-all height of only 21 in. (see accompanying illustration), can successfully load high coal or coal where the height is 30 in. or less.

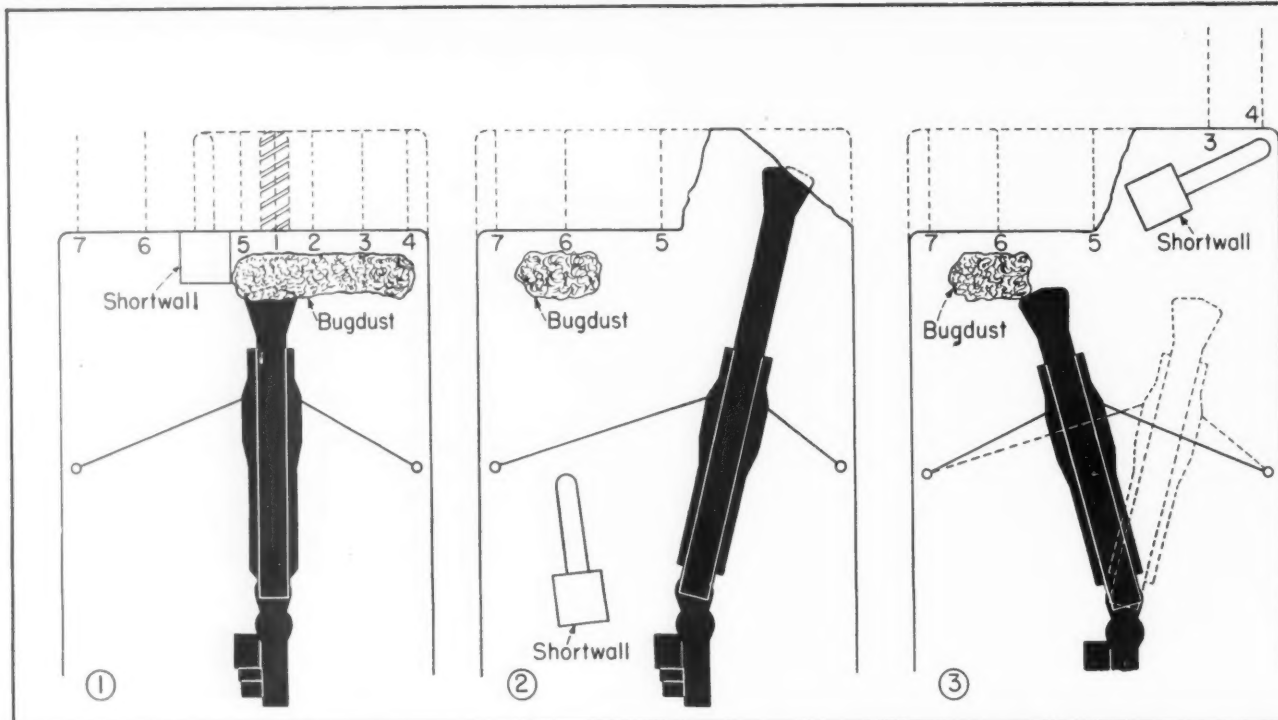
Since the power duckbill is connected to and driven by the shaker conveyor, it is essentially a loading machine with an extendable rear conveyor equal in length to the depth of the room. Coal is picked up by the shovel trough, which passes it through a 45-deg. swivel to the shaker, which in turn delivers a uniform stream of coal to the entry, where it is discharged onto a belt. Several power duckbills may be arranged to discharge onto the same belt, thus insuring full loading.

Pushbuttons Control Swing

The advantages of the power duckbill center around the electric hoist (see accompanying illustrations), which is equipped with two wire-rope drums. Rope from each drum is led through a sheave to jacks set at the rib to the right and to the left. Fig. 6 shows the arrangement. Pushbutton control applies power to either drum, swinging the shovel trough toward either rib. At the same time, the shovel trough may be extended or retracted automatically by pushing a lever in the proper direction. A control lever and pushbutton set are installed on each side of the machine. Thus, much time is saved in operation, with more cleanups per shift.

Each wire-rope drum is fitted

FACE OPERATION WITH THE POWER DUCKBILL



FIGS. 1-5—OPERATING CYCLE in loading a fall with a power duckbill. A carefully planned cycle, double-checked

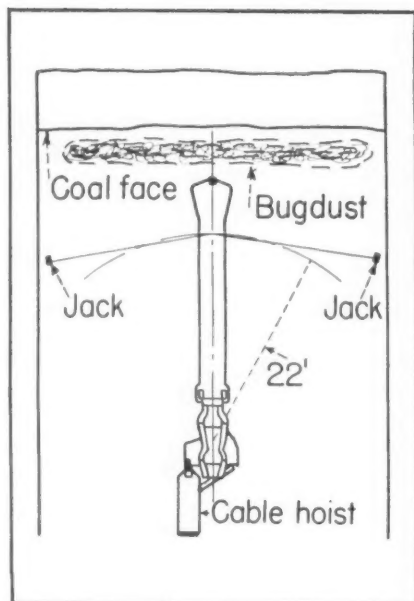


FIG. 6—HOW POWER DUCKBILL is operated in working place.

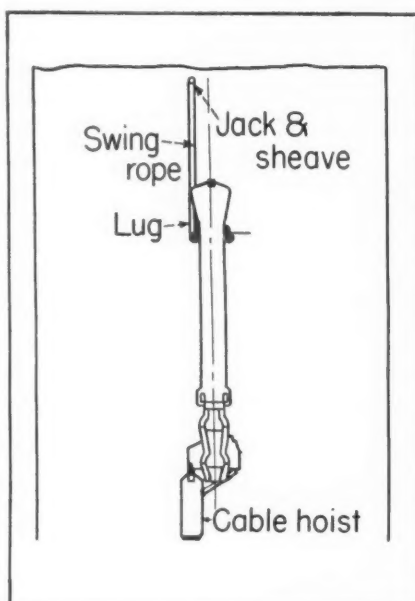


FIG. 7—MOVING DUCKBILL up with one of the swing ropes.

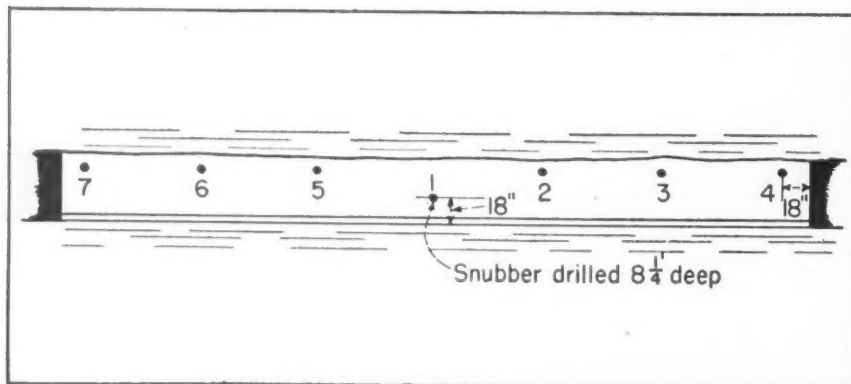
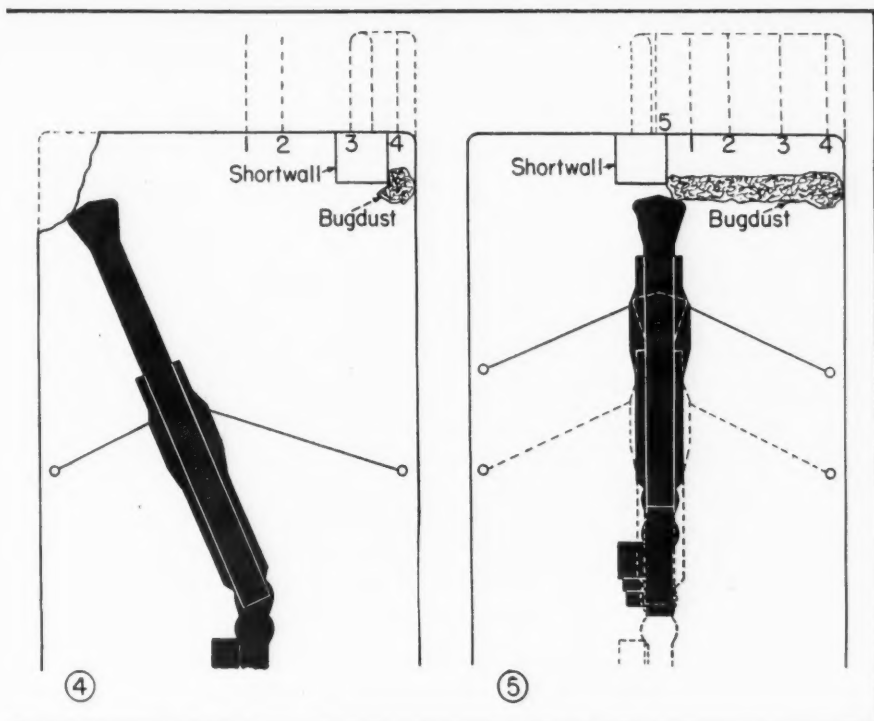


FIG. 8—DRILLING PATTERN for 40-ft. room at Williams mine.

with a drag brake which applies just enough pressure to prevent over-running as the cable is pulled out. There is, of course, a holding brake for each drum to keep the duckbill in a fixed lateral position. Either rope may be extended around a sheave at the face for pulling the power duckbill forward after clean-up (Fig. 7). No shortwall need be tied up for this purpose. Since the shovel trough is advanced and retracted by the shaker conveyor, all movements of the duckbill are by power.

The swivel trough is built to permit a swing of 45 deg. to right or left. Stops are provided on each side to prevent damage to the swivel and effectively limit the travel to 45 deg. Stops also are provided to limit the travel of the shovel trough in forward or backward position. A safety "kick out" protects the shovel trough against repeated contact with immovable objects. All controls on either side of the machine are close together and convenient to the operator. The operator also is far enough from the face—8 to 9 ft.—to be in a protected place. With all motions automatic he has a minimum amount of hard work.

To get maximum efficiency out of a power duckbill, with sufficient belt or car capacity to dispose of the coal, a study of the several jobs at the face must be made and a cycle of operation for each place arranged to avoid loss of production. At the Williams mine, as previously



by time studies, will help insure maximum efficiency from the unit.

noted, thickness of the coal is 42 to 44 in., the top varies from good to bad, and the bottom—damp to wet—is hard. Main entries consist of three headings 18 to 20 ft. wide on 45-ft. centers. The left heading is the air intake and travelway. The belt is installed in the center heading, which serves as one return. The right heading is for rail haulage and also serves as the second return opening.

Panel or cross headings also consist of three headings 20 ft. wide on 45-ft. centers. The left, or outby, opening is the intake and travelway; center, for the belt and return; right (inby), additional return.

Rooms are driven both ways from the panel entries 40 ft. wide on 55-ft. centers. Depth is 340 ft. from the belt heading, with cross-cuts every 60 ft. on alternative ribs. A 20-ft. barrier is left between panels. Consequently, the center distance for cross-entry, or panel, belts is 700 ft. In developing, the duckbills load one cut out of each roomneck, which permits the power duck to be installed and start right off without any shoveling. When bad top makes it necessary, room widths are reduced as required.

Both posts and bars are used in supporting the roof. Where bars are employed, 4x6-in. units 12 to 16 ft. long are installed. In good top, rooms are timbered with three rows of posts on each side of the pan line. Six screw jacks are used at the face in rooms and four in headings.

Where the top is good, headings are timbered with two rows of posts on each side of the pan line. Otherwise, two rows of props with cross-bars are used.

Equipment other than the duckbills include G-20 shaker conveyors, 30-in. trough-type panel belts, 30-in. feeder belt, Sanford-Day 6-ton three-door drop-bottom cars, storage bin on the bottom, and a 36-in. slope belt approximately 500 ft. long on an 18-deg. inclination. The coal loaded by the four power duckbills is discharged to the panel belt by the shakers, which in turn feed to a 36-in. belt 50 ft. long for elevating the coal to mine-car height. The haul to the storage bin is about 1½ miles.

Tons per Man, 20 to 50

The mine is operated on a basis of two production shifts, during which it endeavors to turn out 2,000 tons. Five to seven men are employed on the third shift to handle supplies and equipment moves. Tons per man varies in accordance with top conditions. Bad top requires more timbering and frequently necessitates cutting down room width. Consequently, tons per man on power duckbills at the face varies from 20 to 50 per shift.

Each power duckbill (four in service) is operated by a three-man crew and each Type E unit (six in service) by four. A mine foreman and two section bosses, each supervising two power and three Type E

ducks, are on duty on each shift. Each boss gets one scheduled day off each week—the same day in each period. A relief boss works three first shifts to relieve the general mine foreman and each day section boss. Then, he works three night shifts to relieve the three night bosses. Leslie Lindsey is general mine foreman and Orin Butler is night mine foreman. Section foremen are Boyd Phillips, Carlton Prowse, Mervin Alsbrook, Deward Belcher, E. C. Hardy and Clinton Clark. Robert Smith and W. H. Beard are tippie foremen and Carr Trathen is billing and supply clerk.

Five-Step Cycle Cuts Delays

To insure maximum efficiency, a definite cycle of operation coordinating all equipment from face to discharge point has been carefully worked out. Face work consists of undercutting, drilling, shooting and loading. Each operation must be properly timed so that as many things as possible may be done simultaneously. A typical cycle may be divided into five steps about as follows:

1. Hole No. 1 (breaker shot—Fig. 1) is fired and the coal loaded out. Three ¼-lb. sticks of 1½x8-in. du Pont "Monobel C" permissible are used in each hole. Holes are fired one at a time.

Holes 2, 3 and 4 are shot and the power duckbill begins loading out the right side of the face.

While loading is being done at the right, the left-hand side of the face is undercut and Holes 5, 6 and 7 are drilled. Bugdust, placed about 6 ft. from and parallel to the face by the power bugduster on the shortwall, is first loaded out.

2. With the left side of the face cut and drilled and the holes tamped ready to shoot, the shortwall is parked back of the face (Fig. 2), where bits may be replaced if necessary, oil checked and inspection carried out, after which the machine runner sets timber. At the same time, the power duckbill is completing the loading of the right side of the face.

3. Holes 3 and 4 (Fig. 3) are drilled as soon as the power duckbill is retracted.

Shortwall moved to right-hand corner ready to sump.

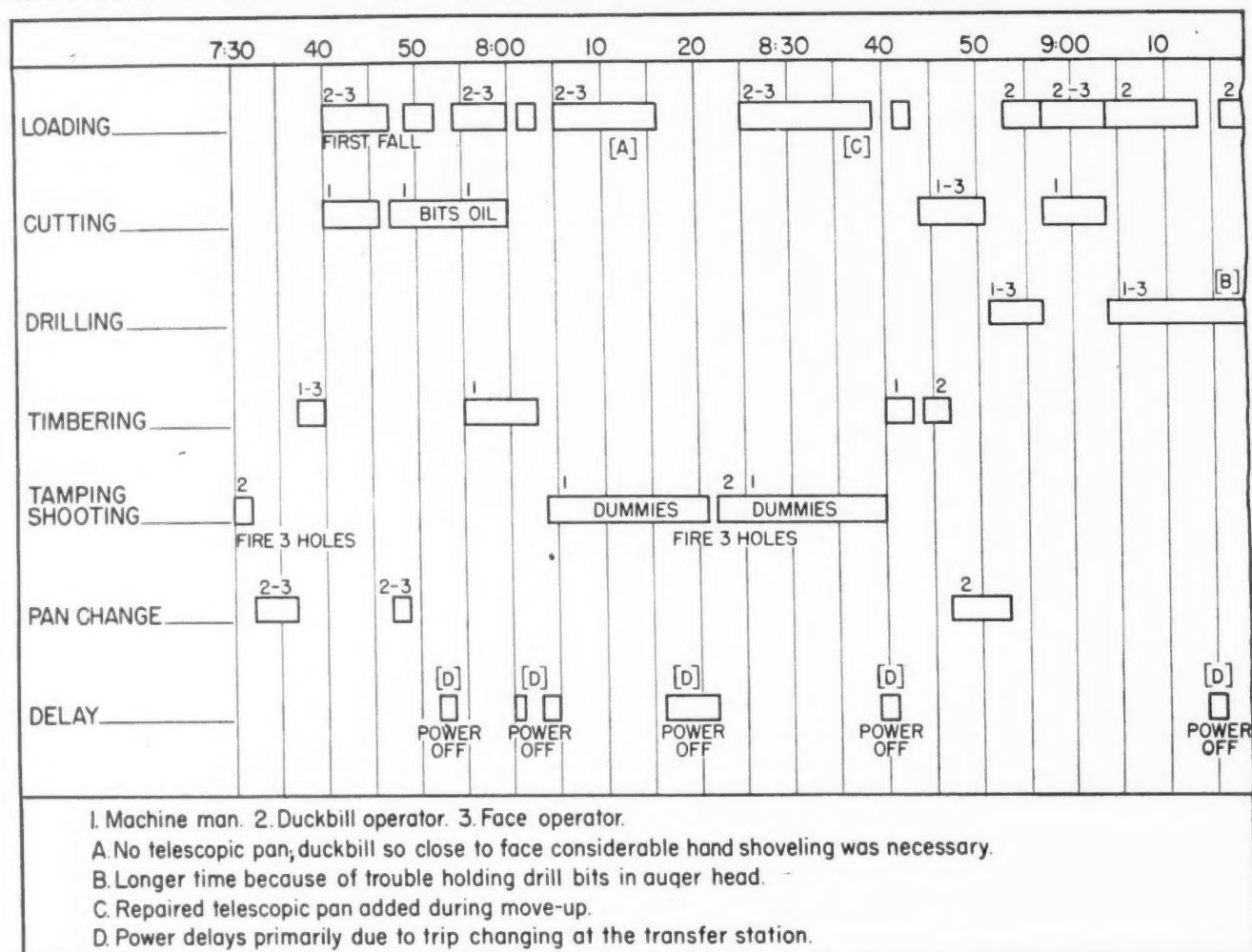
Power duckbill moved into position to load out left side.

Holes 5, 6 and 7 fired; shortwall then sumped.

4. Holes 1 and 2 are drilled (Fig. 4).

(Continued on following page)

TIME STUDY FOR ONE SHIFT'S WORK WITH POWER DUCKBILL



Operation	Man-Minutes	Percent
Loading	457	26.7
Cutting	186	10.9
Drilling	205	12.0
Timbering	86	5.0
Tamping-shooting ...	145	8.5
Pan change	318	18.6
Delays	109	6.3
Idle	206	12.0

Total 1,712 100.0
 Taken under old contract when the men were spending about eight hours at the face.

EQUIPMENT

Shaker—Goodman G-20-B-77; No. 3 troughs; 277 power duckbill.
 Cutting machine: Goodman 512, hydraulic controls, with bugduster; 9½-ft. bar; 8½-ft. cut; Goodman chain and bits.
 Drill—Jeffrey A-7 hand-held.

GENERAL DETAILS

Room No. 1, South panel entry.
 Room—40 ft. wide, 55-ft. centers; average room width, 40.7 ft.
 Coal height—44 in.
 Men on crew—three, except that a

fourth man was added the last four hours.

Pan length—104 ft.

Face at start—Approximately 5 ft. of face to be cut; face all drilled and tamped; duckbill moved up but swivel jacks not placed.

Falls loaded out—Four complete (40, 42, 40 and 41 ft. wide).

Tons loaded—204.

Tons per man at the face—58.4 (on 3½-man basis).

Calculation factor—80 lb. per cubic foot.

Shortwall cuts across right half of face.

Power duckbill completes loading of first fall by cleaning up left rib.

5. Power duckbill ready to move up when first fall is entirely cleaned up (Fig. 5).

Shortwall cuts far enough past center of face to permit power duckbill to pull itself into its new position and also to permit shooting No. 1 hole.

Pan line extended.

Holes 1, 2, 3 and 4 tamped ready for shooting.

Cycle completed ready to repeat.

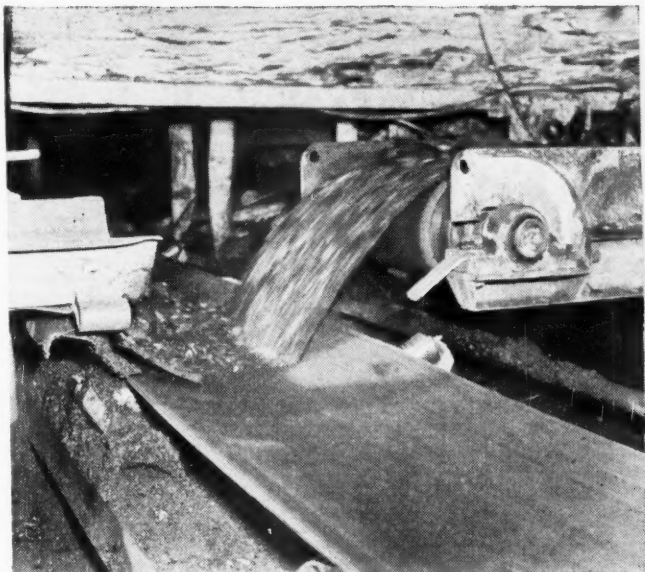
It is exceedingly important that

this or some equally well-planned cycle be employed if maximum tonnage is to be secured. After the cycle has been set up and has been in operation several shifts, a time-study then will show positively where losses occur. Time-study results may be converted to graphic form to make it easier to pick out places where improvements can be made. Part of a graphic summary of a time-study, with accompanying notes, is shown elsewhere in this article. This study was made when the work day provided approximately eight hours at the face. The ease with which the actual work done by each man can be seen, de-

lays ferreted out and results brought out should be noted.

While this time-study includes only face operations, it is by no means the only one that should be made. To be complete, a time-study should include all men and equipment from face to delivery point.

To further promote efficiency, eight of the Goodman 512 shortwalls in use are equipped with power bugdusters, with two additional installations to be made. The bugdusters remove about 85 percent of the dust from the cuts and the shortwalls use less power. Without the bugdusters, two men would be required to shovel the cuttings



SECTION BELT for four power duckbills discharging onto a 1,600-ft.-long entry belt at Williams mine.



A DEFLECTING BOARD between cars permits loading the six-car trip without stopping the loading belt.



CARLTON PROWSE, section foreman, sometimes uses the pony and sled to travel from one territory to another.



KENNETH SNARR, general superintendent, Williams Coal Co.



LESLIE LINDSEY, general mine foreman, Williams Coal Co.

(9½-ft. bars, 32-in.-per-minute feed). Even then they could not begin to do a good job. Consequently, the bugdusters help make it possible to operate the power ducks with three-man crews. The shortwalls also are used in dragging duckbills and drives to new rooms when moves are made.

A new Baker-Raulang tractor is being used to facilitate the moving of equipment in the territories. Supplies are brought in by rail to the transfer station and then are handled over the belts to the shaker discharge points. Small ponies and sleds then take the supplies to the face. Five ponies are employed and will be retained in this service. At present the tractor is being used to drag as many as four pans at a time from place to place. It can handle four times what a pony can and travels four times faster. A trailer will be built for the tractor

and a winch will be mounted on it, thus fitting it for quick moving of duckbills from one territory to another.

Two separate power circuits feed the mechanical equipment from a Westinghouse 12-tube sealed-type three-car 400-kw. portable ignitron rectifier. All cutting and drilling units are on one circuit. The belts, duckbills and power duckbills are on another circuit, which is interrupted each time a new trip is spotted at the belt-to-car transfer station. Each interruption is about 1½ min. and in the course of a shift (20 trips) totals about 30 min. Power for the haulage system also is provided by the rectifier.

As brought out by experience at Williams mine, the advantages of the power duckbill are about as follows:

1. It is essentially a loading machine with an extensible rear con-

veyor as long as the room is deep.

2. Since the power duckbill always is attached to the conveyor, facilities for taking the coal away always are present.

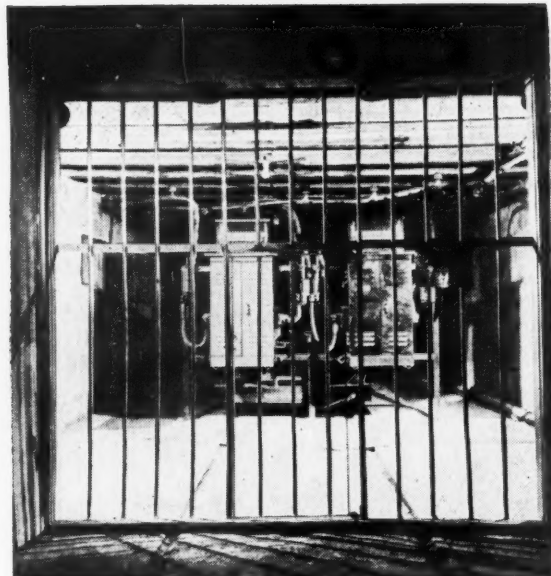
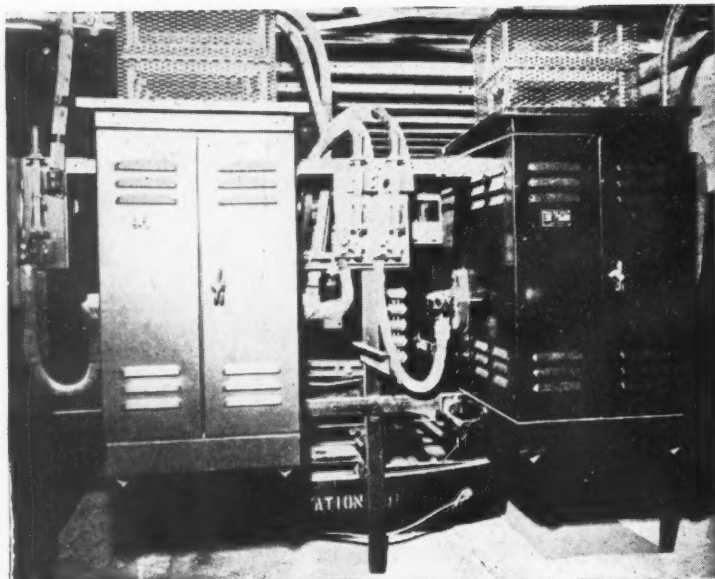
3. All movements of the power duckbill while in operation are made from its own self-contained power source.

4. Rooms 50 ft. wide can be cleaned up.

5. Safety is promoted because the operator is approximately 9 ft. back from the face. One man easily controls the movements of the machine and safety stops prevent damage to parts.

6. Practically all hand loading is eliminated.

7. High tonnages per man are assured if proper attention is paid to coordination of all phases of operation, especially the room cycle, to avoid time losses.

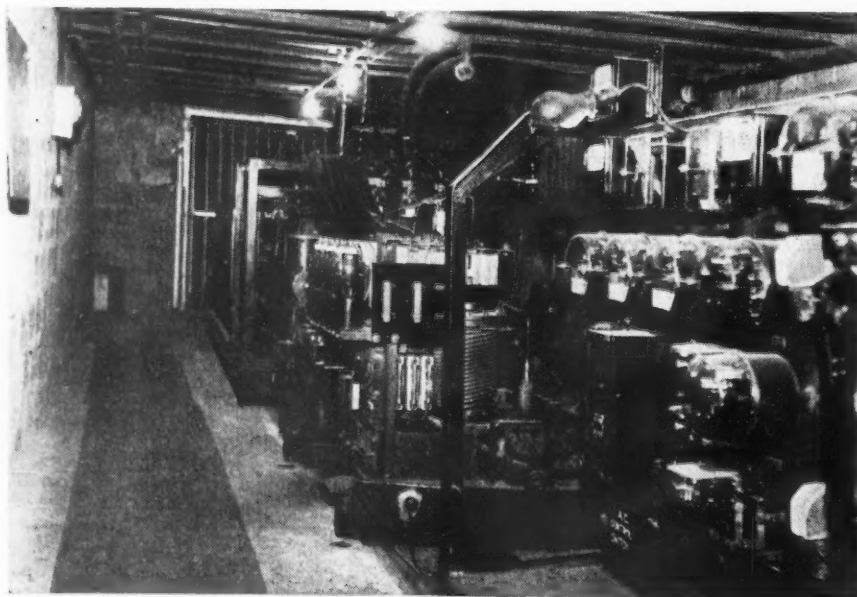


CLOSE-UP AND MORE-DISTANT VIEW of the sectionalizing circuit breakers in a rectifier substation protecting outgoing right and left main-haulage circuits.

Sectionalization at Isabella

New D.C. Practice Conforms to Recommendations of Committee on Reduction of Mine Fires—Isabella First to Put New Standards Into Effect—Operating Time Also Conserved by Sectionalization of Circuits

By G. L. KEMP, Chief Electrician, Weirton Coal Co., Isabella, Pa.
And DONALD J. BAKER, I-T-E Representative, Pittsburgh, Pa.



ONE OF THE FOUR PORTABLE RECTIFIER SUBSTATIONS supplying d.c. power for the operation of underground equipment at Isabella.

SECTIONALIZATION of the d.c. system was an integral part of the modernization and mechanization program at Isabella mine inaugurated by the Weirton Coal Co., a subsidiary of the National Steel Corp., in 1937. Now, sectionalization practice has been revised to conform to the recommendation of a committee sponsored by the U. S. Bureau of Mines and having as its objective the reduction and elimination of mine fires originating from grounds caused by roof falls bringing down trolley wires and feeders. Isabella mine thus becomes the first operation in the industry to meet the new sectionalization standards, set out elsewhere in this article.

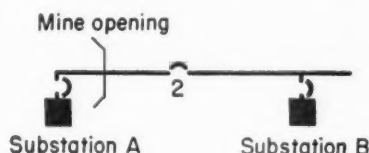
Power for the Isabella 275-volt d.c. trolley and feeder system is furnished by four truck-mounted 300-kw. ignitron substations. All stations operate in parallel from an interconnecting No. 9-section trolley wire, augmented by a 1,000,000-cir. mil feeder and a 500,000-cir. mil grounded positive which extends throughout the main haulage-ways. The track is laid with 80-lb. rail, and both rail and cable are used for the return, maintaining a copper equivalent equal to the negative. In the seven producing sections power is supplied by No. 9-section trolley wire and a 1,000,000-cir. mil feeder in all key entries. A 500,000-cir. mil cable sup-

Recommended D.C. Sectionalizing Practice

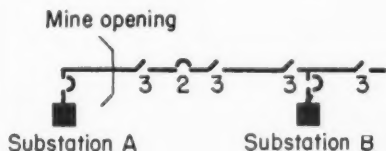
1 In every case, sufficient feeder and return circuit capacity should be provided so that the overcurrent protective device will be opened by a dead short circuit at the most remote point of the circuit.

2 An overcurrent protective device should be installed in the circuit between each two substations. This device should be installed at such a point that the resistance between each station and the device is approximately the same. If sufficient copper is used so that a ground at any place will open the devices at both substations, no intermediate protection need be installed. A sectional insulator, or so-called "dead-block," may be used between the substations if parallel operation with other substations is not necessary for satisfactory power service.

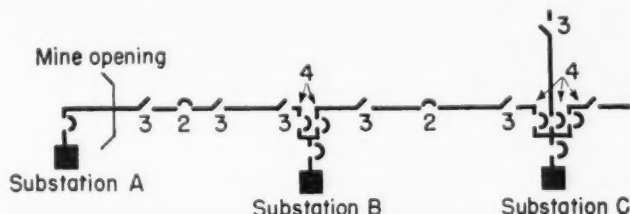
(Diagram scale, 1 in. equals 4,000 ft.)



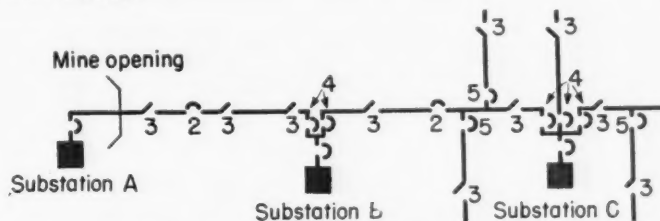
3 For further sectionalizing a disconnect switch or protective device should be placed at not over 1,500-ft. intervals in every power line.



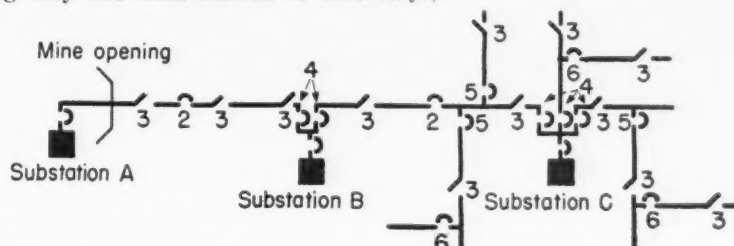
4 An overcurrent protective device should be used in each circuit leaving a substation. These may be fuses or circuit breakers of the manual or the automatic reclosing type. (If circuit breakers are employed, trip-free operating mechanism should be used.) The exception to this is where a substation feeds the main haulage only and only one haulage unit at one time. In this case only one breaker is required at the station.



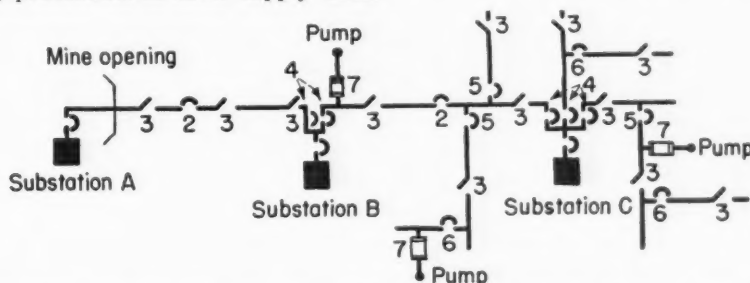
5 An overcurrent protective device should be placed at each main branch circuit.



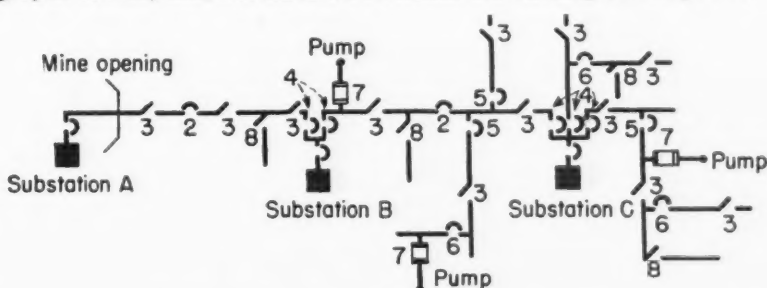
6 Secondary branch circuits should be protected by an overcurrent protective device. (A secondary branch circuit is a circuit feeding only one local section or territory.)



7 Circuits to pumps or other fixed loads should have overcurrent protection at their supply ends.



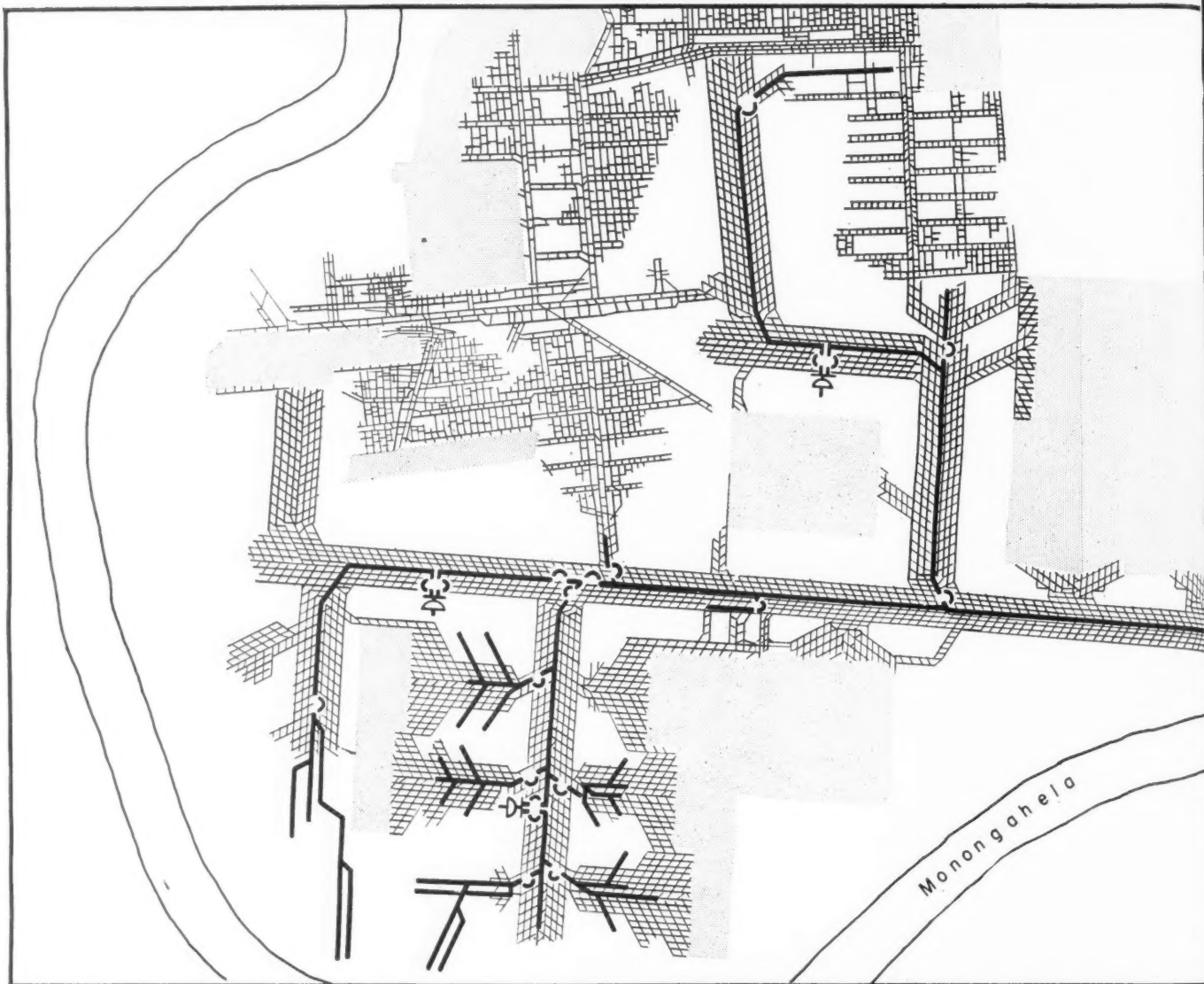
8 Unimportant branch circuits such as infrequently used entries, spur tracks, etc., should have switches for cutting off all power.



9 Each mining setup should be protected by an overcurrent protective device. In some cases it may be necessary to protect two setups by one device.

10 All overcurrent circuit breaker settings or fuse ratings should be as low as is found practical with good operating practice.

11 During non-operating times power should be cut off all idle territories. Where it is necessary to run a pump or other equipment in an idle section or inactive part of the mine, special overload protection should be provided of a capacity limited to that necessary for operation.



ISABELLA MINE AND D.C. DISTRIBUTION SYSTEM, showing approximate

plements the track-rail positive.

Each face section is operated as an individual unit. Each employs a 69-hp. universal cutting and shearing machine, one 25-hp. shovel-motion loading machine, one 8-ton 44-hp. cable-reel gathering locomotive, a 15-hp. timbering machine and a 3-hp. trackmounted electric drill equipped with a 12-hp. tramping motor. Five additional 8-ton 100-hp. locomotives are used in swing service between the working sections and the two sidetracks where main-line trips are made up. All gathering locomotives are explosion-proof.

A single 25-ton eight-wheeled 480-hp. main-haulage locomotive moves the coal in 10-ton cars to a rotary dump at the bottom of the main belt slope. Two 13-ton locomotives, arranged for tandem operation, are available for emergency main-haulage service.

Approximate location of the d.c. substations, circuit breakers and

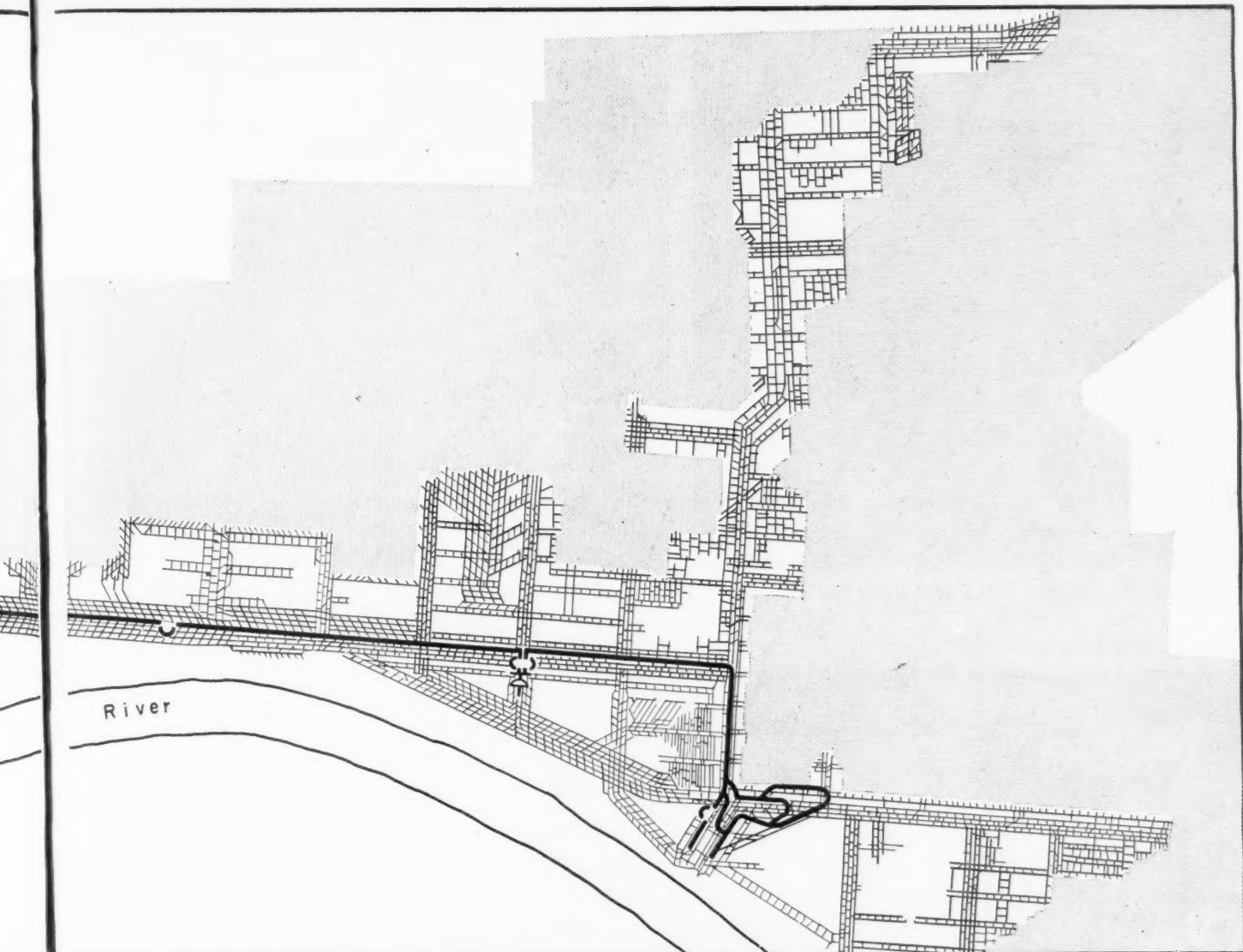
the circuits they control is shown on the accompanying mine map. The diagram is intended, however, to show only the use of inclosed automatic reclosing circuit breakers. Consequently, it does not fully set out how Isabella has met the new sectionalization standards by installing feeder disconnecting switches at 1,000-ft. intervals, plus other overcurrent protective devices.

Sectionalization at Isabella is based on the use of I-T-E 1,200-amp. Type KSC automatic reclosing circuit breakers throughout, thus insuring full interchangeability. These breakers can be adjusted to open at current values ranging from 600 to 2,400 amp.

Where a distribution system is fed from several substations a considerable distance apart, as is common today in mechanical mines, several considerations influence the location of the circuit breakers for maximum protection. The most im-

portant from a fire-prevention standpoint is preventing other substations in the network from feeding into a short anywhere in the lines between the substations. At Isabella, a Type KSC circuit breaker is located in the approximate electrical center between substations. The installations, therefore, conform to the recommendation for good sectionalization practice, which states that an overcurrent protective device should be installed in the circuit between each two substations.

All Isabella substations, as can be seen from the map, are located on the main-haulage entries. In the division of the circuits at each substation the mine conforms to another sectionalization recommendation that an overcurrent protective device should be used in each circuit leaving a substation. A Type KSC automatic reclosing circuit breaker protects each left and right main-haulage circuit as it



location of substations, circuit breakers and the circuits they control.

passes a substation, thereby preventing more than half the territory served by any one station from ever being penalized by an electrical disturbance. With such an arrangement interference with main haulage is held to a minimum. Overcurrent protection is much more sensitive as compared to depending on a single substation circuit breaker with a high overcurrent setting to protect all the territory served by the station.

In conforming to the new sectionalization standards, which also recommend that an overcurrent protective device be placed at each major branch circuit, Isabella has installed a Type KSC circuit breaker at three such locations where major branch circuits leave the substation tie lines (see map).

The seven mechanical-mining sections at Isabella are each protected by a Type KSC breaker. This also conforms to the sectionalization recommendation that each

mining unit be protected by an overcurrent protective device.

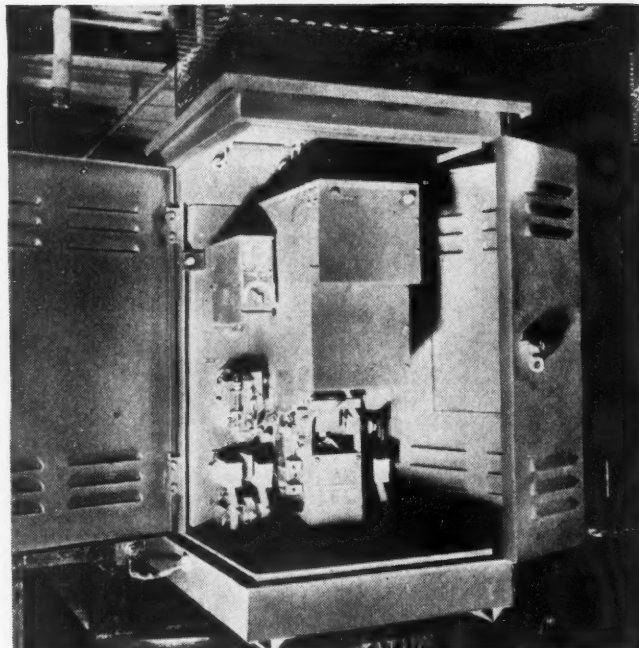
With the growing investment in underground equipment and labor, keeping production interruptions to a minimum is a necessity if maximum cost reduction is to be realized. Keeping unit production up to par or better is an important factor in mechanical mining and a complete sectionalizing installation is the best known method of keeping power troubles in one section from affecting a wide area. At Isabella when an overload, a ground or a short circuit occurs, only one mechanical-mining unit or one small section of haulage is rendered temporarily inoperative.

While the Bureau of Mines and the state inspection department view the Isabella installation from the standpoint of greater protection against short-circuit hazards, experience over an extended period confirms a number of significant operating advantages. On several

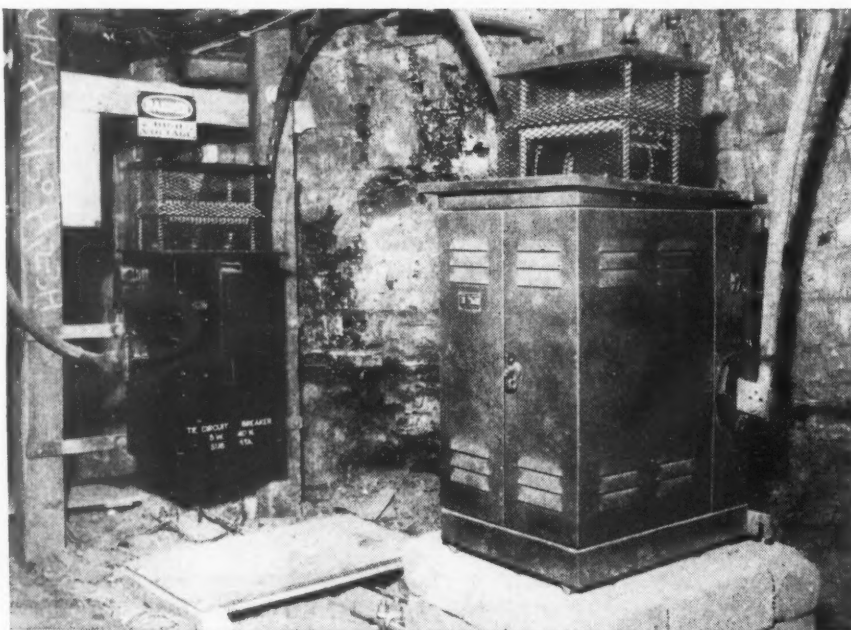
occasions the substation tie-line breakers have kept the main haulage from being involved in a short, with consequent interruption of the movement of coal to the dump.

The principal function of the circuit breakers in the approximate centers of the lines is to prevent more than one substation being involved in a short circuit. If such tie lines are connected solidly, the breakers in distant stations would not open and would continue to feed current into the fault. This is a very hazardous condition and is considered to be the principal cause of many mine fires.

The circuit breakers at Isabella, the management feels, have contributed substantially to a reduction in equipment maintenance because they make it more difficult to abuse underground d.c. machinery. The KSC units are adjusted to pass currents no greater than 75 percent of the load-factor value for the connected motor horsepower per sec-



ISABELLA TIE-BREAKER INSTALLATION (left), with a close-up of a sectionalizing unit at the right—doors opened to show insulated cover over the arc chute and control relays.



TYPICAL INSTALLATION of circuit breakers for branch-circuit protection. The unit at the left was installed some ten years ago. At the right is a modern improved type.

tion. Consequently, motors and controls are better protected as compared to operation with a solidly connected d.c. system and do not show up in the repair shop as frequently.

As in most mobile-loading mines, panel sections at Isabella are developed and exhausted in relatively short periods of time. Consequently, the circuit breakers must be moved to new locations rather frequently as the distribution system changes. With the new sectionalization standards as an application

guide, the complete d.c. network can be checked more closely, resulting in a higher degree of protection. This is advantageous from both the safety and operating standpoints.

Actual installation of the sectionalizing equipment at Isabella has been simplified as much as possible. Most of the tie-line and production-unit protective breakers are mounted on concrete blocks in crosscuts along the entries. Some of the units protecting the right and left haulage entries at each portable substation are mounted on steel frames

within the stations. These frames are arranged so that when the substation advances, all accessories move with it.

Some of the Isabella Type KSC breakers are equipped with a new form of overload device known as an "instantaneous multi-range over-current relay." This is a double form of the more common over-current relay and actually incorporates two relays on the same supporting frame. One series coil is rated the same as the circuit breaker itself and is adjustable between 50 and 200 percent of that rating. A switch permits either the higher or lower-rated series coil to be selected for controlling the breaker.

For off-shift and holiday protection, some of the circuit breakers may be adjusted to open on current values as low as 50 amp. for protecting long branch circuits carrying only a light pump load. Thus more positive fire protection is assured. When a direct short circuit occurs, the breaker still locks open until the fault condition has been corrected.

Experience with the major part of the sectionalizing equipment now extends over a number of years at Weirton and the conclusion is that operation without it would be less satisfactory. While a record is kept of the number of circuit-breaker outages, only estimates can be made of the total time saved in a given period. It is believed, however, that the complete installation has reduced over-all operating losses an average of 20 minutes per shift.

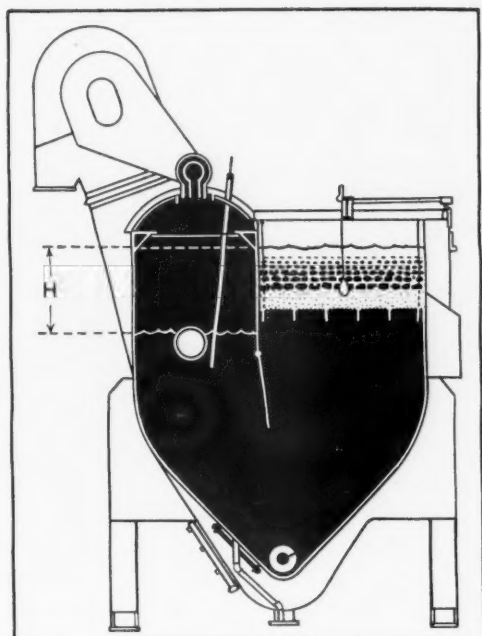


FIG. 1—CROSS-SECTION of Baum jig showing general principles.

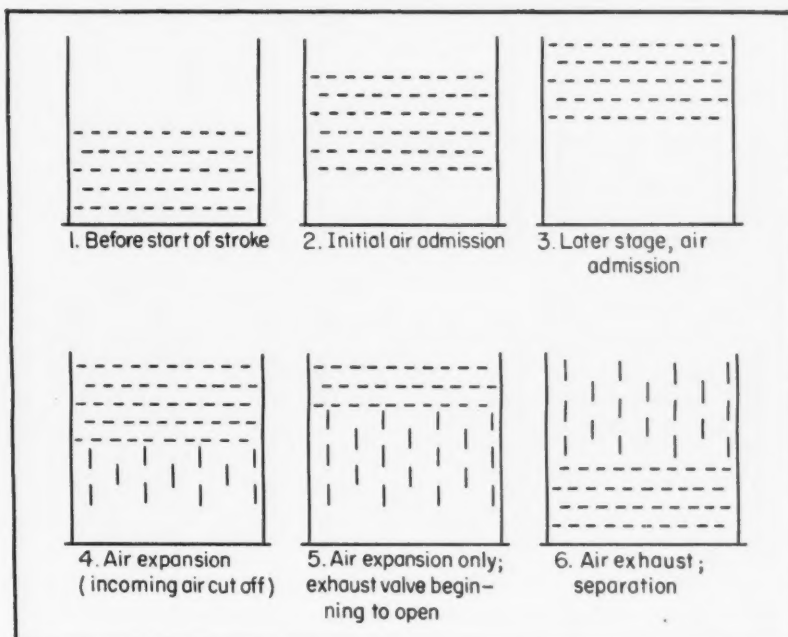


FIG. 2—HOW A JIG BED opens with "back-stroke" separation. The entire separation is on the back, or down, stroke.

Heavy Medium in the Baum Jig

New Washing Process Based on "Back-Stroke" Jigging and Circulation of $\frac{1}{8} \times 0$ Bone Medium From Screening and Crushing Refuse — Results at Least Equal Those Shown Possible by Float-and-Sink Analysis

By **BYRON M. BIRD**

Technical Consultant, Jeffrey Mfg. Co., Columbus, Ohio

RECENT DEVELOPMENTS in the art of coal washing have made it possible to convert the commonest of all types of washers—the Baum jig—into a heavy-medium unit offering all the advantages of that process. This result has been achieved by development of "back-stroke" jigging and use of the natural medium-forming material to be found in every coal.

Jigging is inherently a "heavy-medium" process. For instance, in an Alabama jig operated to make a separation at 1.60 sp.gr., the bed showed 1.53, measured just above the opening leading to the refuse elevator. This measurement was the average of the solids and the water. And it was a true medium, with every particle helping to build medium for every other particle.¹ But it was 0.07 sp.gr. below that of

the actual separation being effected by the jig.

Since that time one or two instances have been found where the specific gravity of the natural jig bed was right or very close. But such cases are unusual. Typically, a jig feed is deficient in particles of the right size and density to form a medium of high enough specific gravity. But the fact that the natural jig bed is so close to the desired specific gravity makes building it up artificially very attractive. Evidently the quantity of medium to be added would be very small.

The development of a suitable medium has been investigated over a period of years and a workable answer has been found—one that in all essential particulars changes the Baum-type jig into a float-and-

sink machine capable of washing any size range simultaneously from 8 in. to 200 mesh.

This development has come slowly. One reason for this will be evident at once. If an artificial medium is to be used, it must be kept out of the washed coal. This has meant development of the jigging process itself for, obviously, if a conventional type of jig stroke is used (one in which a considerable part of the separation takes place on the up stroke), the high-specific-gravity material necessary to form a suitable medium will be washed over into the washed coal. The work also has progressed slowly for another reason. The investigators have been groping in the dark. Getting one's hands on the fundamentals, so that systematic experimentation is possible, has been a slow process.

The development of a heavy-medium jigging process will be reviewed in the following material. Since "back-stroke" jigging pre-

Abstract of a paper presented at the 1947 Indiana Coal Conference, then revised and presented at the joint meeting of the West Virginia Coal Mining Institute and the Central Appalachian Section, A.I.M.E., Charleston, W. Va., Dec. 12-13, 1947.

¹"Principles of Gravity Concentration," Dr. B. D. Thomas, "Coal Preparation," A.I.M.E., 1943, p. 249.

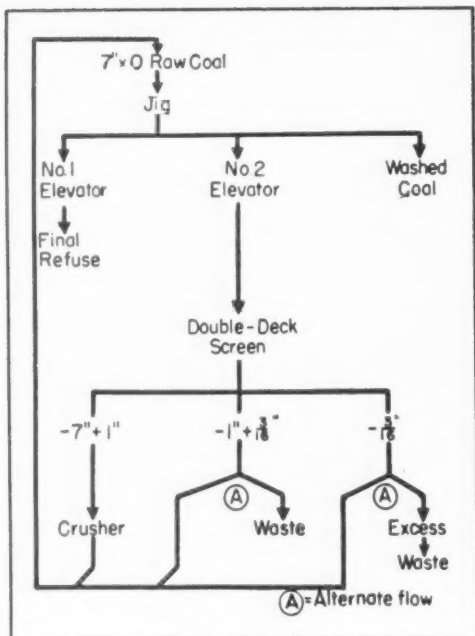


FIG. 3—HEAVY-MEDIUM CIRCUIT for a Baum-type jig.

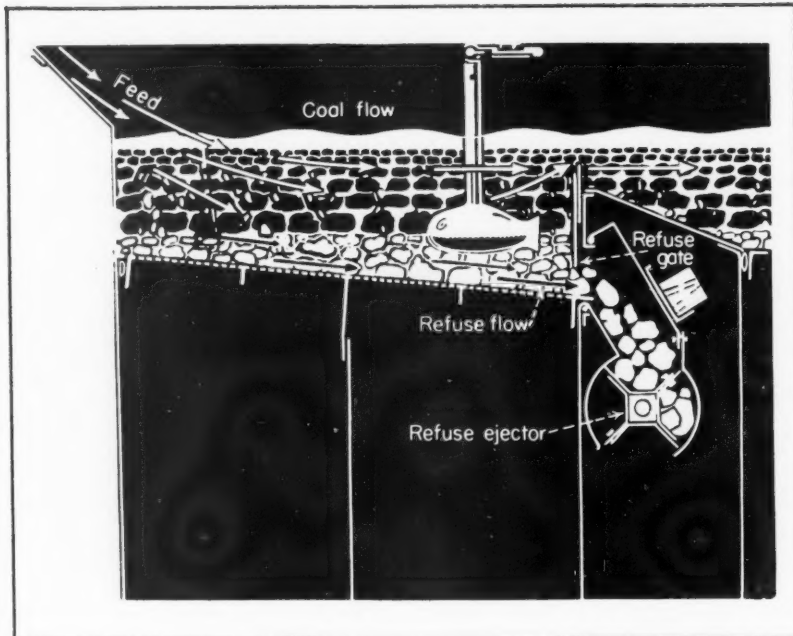


FIG. 4—MEDIUM CONTROL reflects jig construction and operation. The float is a hydrometer that measures the specific gravity of the coal-and-water mixture.

ceded it, and is a necessary part of removing the heavy medium from the washed coal, it will be treated first.

"Back-Stroke" Jigging

Fundamental equation—A simplified form of the differential equation for a particle in *down* currents, as derived by Chapman and Mott,² is as follows:

$$\text{Downward motion} = \frac{\text{Sp. Gr. } K_1(S - M)_g}{S} - \frac{\text{Size and Shape } K_2(V - W)_g}{S}$$

K_1 and K_2 are constants.

S is the specific gravity of the particle.

M is the specific gravity of the pulp.

V is the downward velocity of the particles.

W is the downward velocity of the water.

g is the acceleration of gravity.

The Chapman and Mott equation has been simplified somewhat and modified by the substitution of the specific gravity of the solids-and-water medium (M) for the specific gravity of water appearing in the original equation. The point must be emphasized that this is not one of the conventional equations commonly appearing in textbooks on

ore dressing. Such equations usually deal with separation in *up* currents. This equation deals with separation in *down* currents.

The equation contains two terms, one involving specific gravity and the other size and shape of particle. The first thing to note is the expression $(V - W)$ in the second term. Evidently, if someone can develop a process in which V equals W , the entire second term, involving size and shape of particles, will vanish. Then the downward motion of any particle will depend solely on the first term, involving only specific gravity. To anyone familiar with jigging, with a down stroke following every up stroke, that process would seem to hold great promise, but all efforts failed in the earlier work because of the fact that the average jig bed opens on the up stroke.

The Jigging Cycle—Fig. 1 shows a cross-section of a Baum jig—in effect a U-tube filled with water. On the right leg is the jig bed; on the left, the air chamber. Above the air chamber is a receiver and an air valve. At the beginning of each stroke, air is admitted rapidly through the valve for about one second. It pushes down on the water at the left, producing a sharp upward acceleration on the right that lifts the bed in a mass. Then the incoming air is shut off and the air in the chamber at the left is allowed to expand for roughly one second. During this stage the pressure drops and the upward accel-

eration of the water decreases rapidly, permitting the coal bed to open from the bottom upward. The result of these two steps is to suspend the particles of coal and refuse in the water ready for separation. Then the air is exhausted and the separation takes place, with the water and the particles falling together. The stages of the separation of the jig bed can be followed in Fig. 2. The important thing to note is the fact that the entire separation takes place on the "back," or down stroke.

Someone may object at this point that the particles and the water cannot continue to fall at the same rate and that the particles must inevitably gain on the water if any separation is to take place. If so, there must be some separation according to size and shape. This is a point that has bothered about everyone, including the author. And yet, as an experimental fact, the jig seems to function as if no separation according to size or shape were taking place. Finally, Dr. B. T. Thomas, Battelle Memorial Institute, pointed out the answer. The lack of sizing apparent on the down stroke lies in the fact that the bed comes to rest on the screen at the end of each stroke.

He pointed out that the down stroke may be roughly divided into three phases. In the initial phase the water and particles fall together. Then follows a phase in which the particles gain on the water, during which some separation according to size and shape oc-

²"The Cleaning of Coal," Chapman and Mott, Chapman & Hall, Ltd., London (1928).

curs. But everyone heretofore has failed to grasp the importance of the particles coming to rest on the screen plate. Necessarily, just as the bed closes, the particles and the water pass through a stage in which they again fall at the same speed. That critical instant is of great fundamental importance in jigging unsized feeds.

Once some of the fundamentals of the down stroke were grasped, certain essential techniques became evident, as follows:

Rapid Acceleration—The upward acceleration of the water must be rapid enough to lift the bed in a mass. But for some reason that is not at present understood it must not be more rapid than necessary to accomplish this objective.

Intermediate Sizes Required—The screen analysis of the jig feed must be such that the bed can be lifted in a mass. To be lifted the particles must lock together. In general, this involves sufficient intermediate sizes. With coal, this point is of almost no importance, but with hard ores a jig feed made by some special type of crusher sometimes is difficult to lift in a mass. If this occurs, some intermediate sizes must be re-cycled.

Low Water—The "net" upward water must be a minimum. Study of Fig. 1 shows that the rapidity of the down currents is determined by the difference, H , in the water level in the jig bed and that in the air chamber. The term "net" upward-current water needs some explanation. It is the water added through the jig header to replace that which does not come back through the screen on the return stroke. Inasmuch as the down stroke should be as rapid as practicable, it follows that in an ideal jigging operation the "net," or added, water should be zero. Enough water should be introduced with the feed to transport the coal along the jig and no other water should be needed.

Some day jigs will be built without headers. This construction will solve many a jigging problem, since the average jig operator has a mania for using water. He wants all the valves wide open. If there are no valves, he cannot get into trouble. Actually there is no surer way to throw off the cleaning of the small sizes than to use water indiscriminately. As an example, in a recent Baum-jig installation handling 500 t.p.h. of 8x0 coal, the jig was run during a preliminary-adjustment period with quite a bit of water on the header. After the

"bugs" were worked out of the plant, attention was given to tuning up the jig. The first step, naturally, was to cut water. The valve on No. 2 compartment was gradually closed entirely and the one on No. 1 compartment was closed in large measure. It was not shut off entirely because the water lines to the push-water box ahead of the jig proved to be too small to supply the necessary transportation water. For this reason some water was supplied through No. 1 compartment.

After the plant had been running for an hour the railroad inspector dropped up to see what had happened. He remarked that he had had no complaint on the quality of the cleaning, but something had happened to the fine sizes. The cleaning was so much improved that it was obvious even to a casual inspection.

What about power consumption? From the fact that less water is being circulated, one might reasonably think that the total power consumption on the jig would be reduced. This does not follow. The power to jig coal does not vary greatly. As water has been cut down, the volume of air used has been increased along with, in some instances, the pressure at which it is used. But, of course, the reduced volume of water is very advantageous either in reducing the size of the clarification system or in improving the clarification. This is a matter of importance today when so much emphasis is being placed on running plants in closed circuit and wasting no water to the rivers.

Long Expansion Periods—The period during which the air is permitted to expand is of great importance in getting the bed adequately opened so that all of the water can return to the hutch compartment on the return stroke. As time has gone on, the trend has been to more and more expansion. For instance, a typical jig stroke today is 100 to 120 deg. air admission, 100 to 80 deg. expansion and 160 deg. exhaust. The long expansion period has been very beneficial in getting a perfect opening of the jig bed on the up stroke.

A further contribution to the effectiveness of the expansion period is a very slow jig speed—commonly around 22 strokes per minute. This provides ample time for complete opening of the jig bed to the very topmost layers on every stroke.

Shallow Jig Bed—The depth of jig bed, i.e., the distance from the screen plate to the overflow lip,

should be a minimum. If it is too great, the bed acts as a valve interfering with the return of water through the screen plate. Experience shows that in handling even an 8x0 feed, the jig can be operated successfully with a bed as shallow as 22 in.

Clean Circulating Water—To facilitate return of the water through the screen plate the circulating water should be as clean as practicable. The jig action is distinctly dampened if the water gets above 25 percent solids. In this connection it often has been argued that a jig should be run with dirty water, because its higher specific gravity is an advantage. But a moment's consideration will show that a specific gravity as low as 1.08 really could not improve jig operation in any significant way. Experience shows that the cleaner the circulating water, the better the jigging.

Heavy-Medium Jigging

The preceding discussion has been necessary to show a workable scheme for using a heavy medium without washing it over with the coal. Necessarily, the medium of high specific gravity must go out with the refuse or with the middling product so that it can be recovered and returned to the jig feed. The pure back-stroke separation takes care of this problem.

But, someone objects at this point, why have the medium? If the entire size range can be separated efficiently, why complicate the circuit by introducing any medium? That question gave the writer considerable trouble. Initially, he tried out the medium without analyzing carefully what he expected to get. The improvement in the jigging went beyond his fondest dreams. Then he wondered why. He recalled an experience in Alabama where he jigged 1x0 Mary Lee coal in a hand jig, effecting a separation at 1.38 sp.gr. The stroke used was very similar to that now used on the Baum jig and just described. If straight jigging will effect separations like that, why add the medium?

The answer, however, once one thinks carefully, is actually simple. True, back-stroke jigging of unsized materials is inherently a perfect gravity process—the only one thus far discovered—but it is subject to severe capacity limitations. For instance, in the Mary Lee test just mentioned, the tonnage might

be compared to that of running 25 t.p.h. in a three-compartment 7-ft. Baum; in other words, running it at one-tenth its rated capacity. What the medium does, then, is speed up the separation.

That this is the case may be readily seen from Table I, in which some actual values are substituted in the first term of the fundamental equation previously given. The figures show the effective relative specific gravities of two particles of bone, one of 1.50, the other of 1.45 sp.gr. The ratios govern the rapidity of the separation. With different media they vary all the way from slightly above 1.0 to infinity as the specific gravity is increased. But the fact should be noted that they gain most rapidly as the medium approaches closely the specific gravity of the separation; that is, 1.45. This is a clear demonstration of the fallacy of attempting to run a jig with very dirty water, because, as mentioned previously, water containing 25 percent solids, which is the upper safe operating limit, has about 1.08 sp.gr. Obviously the increase from 1.00 with clean water to 1.08 for dirty water would hardly change the ratios.

The gains in relative specific gravity are tremendous, but they cannot be fully realized in speeding up the separation because, as the density of the medium increases, the particles settle more slowly. However, the over-all gain is very great, as shown by greatly improved cleaning of the fine sizes with an artificial heavy medium present.

Medium Circuit—A basic medium circuit is shown in Fig. 3. The essentials include a screen to size the product of the last refuse elevator into three sizes. The coarsest size is crushed. This, together with the undersize of the bottom screen, is delivered back to the jig feed. The intermediate size is sent directly to refuse. The meshes of the top and bottom decks are chosen to suit the coal. Usually the top is about $\frac{3}{4}$ and the bottom about $\frac{3}{16}$ in. As shown, the $\frac{3}{4} \times \frac{3}{16}$ size is discarded.

If the meshes are properly chosen the intermediate size will be essentially bone, from which the coal cannot be liberated except by fine grinding. Actually, however, a number of instances already have been found in which there is laminated material in this intermediate size. In those cases the entire product of the last elevator is run through the crusher and returned to the jig

feed. Whenever this practice is workable, it obviously is desirable since it results in a maximum recovery of coal. The returns to the jig feed may either be conveyed or pumped.

This basic circuit should be carefully distinguished from one in which the crushed materials are jigged in a separate jig. That practice defeats the purpose, which is to build up a medium in the primary jig. This point leads naturally to the next section, dealing with the medium band.

The Medium Band—When the experimental work in building a medium in the jig was first undertaken, a rather natural step was to recycle shale. However, the ash content of the washed coal could not be maintained with an artificial shale medium. The medium density obviously was too high. It had to be narrowed down to bone of about 2.00 sp.gr. This observation was very perplexing at first, but it probably can be explained now—at least in part.

Remember that the medium being recycled is composed of mixed sizes, usually about $\frac{1}{8} \times 0$ in. This being the case, the particles need not be of very high specific gravity relative to the specific gravity of the medium—in fact, cannot be. For instance, an unsized medium of 55-percent solids by volume certainly will be mobile. This means that bone of about 1.9 sp.gr. can be used for a medium of 1.50 sp.gr. and bone of about 1.8 sp.gr. for a medium of 1.45.

The conclusion is inescapable that bone in this range constitutes the essential constituent of the medium. Materials of higher and lower specific gravities that may be returned from the middlings crusher become primarily coal and refuse, as distinguished from the artificial bone medium. Necessarily, all sizes in this specific-gravity range function as medium, each medium particle tending to support any coal or refuse particle coarser than itself. It follows, however, that the finer particles are of greatest value since a $\frac{1}{4}$ -in. particle of medium can support only pieces coarser than $\frac{1}{4}$ in., whereas a 150-mesh particle is effective on all coarser particles.

Quantity of Medium Required—The quantity of medium required naturally varies greatly according to the proportion of bone of the right specific gravity and size in the jig feed. In an average case of a jig washing 500 t.p.h., the last

elevator usually delivers around 10 t.p.h. of fine bone, or 2 percent by weight. Obviously, if the jig feed happened to contain such a percentage no medium would be necessary and, as mentioned earlier, at least two cases have been found where that condition has prevailed. Until the experimental work was done in connection with developing the heavy-medium circuit, these cases were very puzzling. One, for example, occurred with Pocahontas No. 3 coal. The jig feed presented a difficult washing problem, the coal containing a high percentage of near-gravity materials—up to 20-percent 0.10 specific gravity. Yet the separation was extremely efficient.

This is now easily explained. Ahead of the jig, the carbon sizes ($7/16 \times 0$) were screened out and cleaned on air tables. Then the air-table refuse and middlings were added to the jig feed. This procedure gave something approaching the right quantity and size of bone of around 1.9 sp.gr. Thus, the jig was being operated with a good heavy-medium circuit and this fact explains its sharp separation.

Control of Medium Quantity—When a heavy-medium circuit was first considered, the problem of how it should be controlled loomed large. But inasmuch as many companies with heavy-medium processes keep someone busy running float-and-sink tests to control the washing, it seemed reasonable to believe that coal companies in general would do so with the jig. With this idea in mind, the first heavy-medium installation was observed carefully to see how much attention it required. But the jig ran along all day without any discernible change. What was happening? Obviously the jig feed had changed a lot during the shift and one would reason that the medium should have required some attention.

However, as soon as a longitudinal section of the jig, as shown in Fig. 4, was examined, at least a partial explanation was found. The float is a hydrometer measuring the specific gravity of the mixture of coal and water. If too much medium or a medium composed of particles of too high a specific gravity is formed, the specific gravity is increased and the float rises. As soon as this occurs, the star gate begins to draw refuse, especially coarse refuse. As a result the refuse bed is thinned out. As this occurs, the jig hutchers more rapidly and withdraws more fine refuse and, with it,

Table I—Effective Specific-Gravity Ratios of Two Particles of Bone of 1.45 and 1.50 Sp. Gr., Respectively, With Various Media.

Medium	Medium Sp. Gr.	Ratio	Remarks
Water	1.00	1.07	Typical of closely-sized feeds on jigs.
Natural jig bed.	1.40	1.93	Good Baum-jig practice on unsized feeds.
Artificial bone medium	1.42	3.38	New practice with bone medium.
Same	1.44	10.63	Same
Same	1.45	Infinity	Same

Table II—Interpretation of Near-Gravity Percentages.

±0.10 Curve Percent	Degree of Difficulty	Preparation
0- 7....	Simple	Almost any process; high tonnages
7-10....	Moderately difficult	Efficient processes; high tonnages
10-15....	Difficult	Efficient process; medium tonnages; good operation
15-20....	Very difficult	Efficient processes; low tonnages; expert operation
20-25....	Exceedingly difficult	Very efficient processes; low tonnages; expert operation
Above 25....	Formidable	Limited to a few exceptionally efficient processes; expert operation

medium through the screen plate. In this way the medium density is controlled by the float in No. 1 compartment.

As a result, about all the jig operator needs to do is to put back plenty of medium; the jig will do the rest. If any tendency develops for too much medium to be held in the circuit, which has occurred in one instance, larger perforations can be used in No. 1 compartment. For example, in this instance they were changed from ¼ to ⅜ in. This increased the hutching rate and enabled the float to control the medium circuit.

This explanation of the way the medium density is controlled may bother those who are familiar with other heavy-medium processes, in which the medium particles are supported in vertical currents of water. Their first thought is this: Medium specific gravity should not be affected by the amount of medium. That is correct for *up* currents, but does not hold for *down* currents. In *up* currents the interstitial spaces between particles are

fixed and, consequently, specific gravity of the medium for any given kind of particle. However, this is not so in *down* currents in a jig. The interstitial spaces can vary with the quantity of medium. Thus, if too much medium builds up in the circuit, that fact is reflected by the float in No. 1 compartment rising higher on each stroke and adjusting the quantity of medium present.

In an initial adjustment of a jig, how can one tell when he has too much medium? Practically, the answer lies in the capacity of the last refuse elevator. If it shows peak loads beyond the elevator capacity, the air should be increased on No. 1 compartment to speed up the hutching rate. Once the right adjustment has been found, the experience has been that it requires no further attention; the float control does the rest.

Why has there been no difficulty with medium getting into the washed coal? As a practical operating matter, medium must come just high enough in the last com-

Table III—Results With Baum Jigs Equipped With Heavy-Medium Circuits.

All Plants Shown Are Making the Yield Shown Possible by Float-and-Sink Tests of Raw Coal at Ash Contents Made in Washing.

Coal Seam and State	Size Range Cleaned Effectively	± 0.10 Sp. Gr., Percent	Tons per Sq. Ft. per Hour
Pittsburgh, Pennsylvania ..	4"x80 M.	4	3.2
Koehler, New Mexico.....	3"x65 M.	22	2.4
No. 11, Kentucky.....	6"x65 M.	5	4.8
5 Block, West Virginia.....	6"x65 M.*	12	2.8

*Raw coal screened and ¾x0-in. air tabled; refuse added to jig feed.

Note: Plants 1 and 2 recover all fines with the washed coal; Plants 3 and 4 lose part of the extreme fines to the river.

Table IV—Performance of Heavy-Medium Separation on Fine Sizes in a 5x0 Feed.

Mesh	Percent			Cumulative Percent		
	Wt.	Ash	S.	Wt.	Ash	S.
+ 20...	1.17	6.89	1.10	1.17	6.89	1.10
— 20+ 30...	5.49	4.87	1.04	6.66	5.22	1.05
— 30+ 40...	13.85	5.18	1.15	20.51	5.19	1.12
— 40+ 50...	10.67	5.66	1.18	31.18	5.35	1.14
— 50+ 60...	8.75	6.57	1.19	39.93	5.62	1.15
— 60+ 70...	3.88	6.43	1.21	43.81	5.69	1.15
— 70+ 80...	5.23	6.96	1.25	49.04	5.83	1.17
— 80+ 100...	18.60	10.70	1.44	67.64	7.17	1.24
— 100+ 140...	24.96	18.38	1.95	92.60	10.19	1.43
— 140+ 200...	4.57	20.97	1.98	97.17	10.70	1.46
— 200...	2.83	22.58	1.81	100.00	11.03	1.47

partment to cover the float, but no higher. What holds the level? The answer is the same as that given for the circuit as a whole. If too much medium accumulates in the last compartment, the medium specific gravity becomes high and the float rises and thins out the coarse bone bed. Then the excess medium hutches through the screen.

One other point might be made. A jig never stops hutching entirely at any time as long as there are any fine materials in the feed. The hutching is merely reduced by holding a coarse bed of refuse on the screen, but not entirely stopped. For this reason, a jig with an artificial medium circuit should never be idled without feed. However, if, through carelessness, the medium is lost from the circuit, it is recovered very rapidly as soon as the normal jig operation is resumed.

Shale in Medium Circuit—Many coarse laminated pieces removed in the last compartment of a jig contain clay or shale. When they are crushed, these impurities

show up in the medium. They are readily rejected by the hutching action of the jig, but are detrimental in dirtying up the circulating water system. This is unavoidable, but crushing of shale should be minimized. For that reason No. 1 compartment (or No. 2 in a three-compartment jig) should be controlled carefully to throw no pure shale or clay particles that contain very little recoverable coal into the last compartment.

Type of Middling Crusher—The most satisfactory middling crusher is a slow-speed hammer mill. It is selective in its action, crushing coal in preference to refuse, but it does crush some bone and thus insures an adequate supply of medium of the required fine size.

Some observations on the artificial medium are as follows:

1. The jig medium appears to act over the entire size range. For instance, cleaning of the 48x100-mesh sizes is greatly improved by its use. This observation is borne out by some data to be presented later. The explanation probably lies in the complete absence of upward interstitial currents in the jig bed.

2. All sizes of coal tend to be washed at one specific gravity. This means, fundamentally, that a falling medium has no sizing action. This is to be expected from the fundamental equation for falling particles given earlier. It gives this medium an important technical advantage over those where the medium rises, since they have a sizing action that limits the size range effectively cleaned.

If a coarse egg size must be washed at a lower gravity than the smaller sizes, the back stroke must be modified by the addition of some water to hold down the medium density. However, many companies, because of the growing importance of the domestic-stoker market today, wish to clean all sizes at a relatively low specific gravity.

3. The crushing circuit becomes of great importance in liberating coal from laminated pieces so it can be recovered.

4. Seemingly, any difficulty of separation can be handled. Some data showing very difficult separations are given later.

Results

In a general way washing results must be considered from the standpoint of the percentage of near-gravity materials, which is a meas-

ure of the difficulty of the separation, and of the size of materials. For instance, no one would expect to jig $\frac{1}{4}$ x0 coal at the same rate as 6x0. The fine feed would require several times as much effective jigging capacity as the coarse. However, in the data to be given the screen analyses are not widely different and, consequently, the results may be appraised on the basis of percentages of "near-gravity" materials.

Percentage of "Near-Gravity"—

The best measure of the difficulty of a separation is the percentage of material within ± 0.10 sp.gr. above and below the point of separation. For example, if a separation is to be made at 1.50 sp.gr., the important factor in measuring the difficulty of the separation is how much of the feed is between 1.40 and 1.60. This percentage, to make it comparative with percentages from other coals, is commonly reported as a percentage of the portion floating at 2.00 sp.gr. This procedure prevents large variations in the quantity of pure rock in the jig feed from obscuring the real washing problem.³ Table II gives data for interpreting washing difficulty encountered.

Table III presents over-all results for several plants. In all of these the jigs are making at least the recovery shown possible by the float-and-sink data on the raw coal. For instance, if the float-and-sink tests on the raw coal show a possible recovery of 80 percent with a 6-percent ash, the jig is recovering at least 80 percent of washed coal analyzing 6-percent ash. To whatever extent there is inefficiency in the separation—and there always is some—it is at least offset by coal recovered from crushing laminated pieces. The difficulties of the separations cover a considerable range from simple to very difficult. The capacities given are actual, not contract, tonnages. The figures are reported in this way because one plant is being run below contract capacity.

In all instances except the first the data are sketchy, having been collected over short periods of time. For this reason some individual result may be in error, but the data taken collectively present a consistent picture. Moreover, several other plants on which the data are not considered good enough for

presentation are probably doing equally good work.

The figures in Table III relate to the separation over the entire size range. How about the cleaning of the fine sizes? To answer this question a set of figures is given in Table IV for the $\frac{1}{8}$ x0 sizes screened from washed 5x0. These figures, it should be said, were taken over one week's time in a plant in which a heavy-medium circuit was being used and in which the water circuit was entirely closed. Consequently, they should be considered very reliable.

The data show that the ash and sulphur percentages do not begin to mount until 80 mesh is reached. Down to that size, the fines are as well cleaned as the composite 5x0 size. The complete size range showed 6.53-percent ash and 1.7-percent sulphur. The composite to 80 mesh in Table IV is 5.83-percent ash and 1.7-percent sulphur. A sharp rise in ash and sulphur contents will be noted in the minus-80 plus-100 mesh. Below 100 mesh the jig was ineffective, the ashes given being essentially the same as those in the raw coal. For comparison with these ashes and sulphurs, the figures for the raw $\frac{1}{8}$ x0 coal were 12.27-percent ash and 1.55-percent sulphur.

Summary

A basically new method of operating a jig is described, one now in use in six washeries, the first installation having been made in 1942. Data on four of the plants show a recovery at least equalling that shown possible by the float-and-sink data on the raw coal.

The method involves two essential features:

1. The circulation of a bone medium about $\frac{1}{8}$ x0. This fills the interstitial spaces in the jig bed and, in this way, the jig in effect is converted into a float-and-sink machine.

2. The use of a type of jig stroke such that the entire separation takes place on the back, or suction, stroke. This type of stroke holds the medium in the bed and prevents the jig from washing it over with the coal.

Many men have contributed to the developments described in this paper. Of these, the author wishes to mention particularly Drs. B. T. Thomas, E. M. Baroody and H. W. Russell, all members of the staff of the Battelle Memorial Institute, Columbus, Ohio.

³"Interpretation of Float-and-Sink Data," Byron M. Bird, Proceedings of the Third International Conference on Bituminous Coal, November, 1931, Vol. II.



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The Foremen's Forum

Better Coal-Mine Management; Procedure and Results

MANAGEMENT is the foreman's job. But, what is management, what is its goal and how can it best proceed to reach that goal?

Webster's Collegiate Dictionary, 5th Edition, defines a "manager," in part, as "One who manages." Looking further, that same authority gives the following definition for "manage": "To train (a horse) in the manège; to put him through his paces." We are not concerned with horses here, so it is necessary to explore some more, arriving at the following: "To control and direct; to conduct; guide; administer."

The second definition brings us closer to our goal. If we study it, we find that management takes in quite a lot of territory. For instance, one man can take a shovel and do pretty poorly with it all his life. Another, by studying the way he uses his shovel and by trying to get his coal in better condition for loading, can get out a lot more tonnage. In his own field, he practices good management. Consequently, he makes himself a more valuable man. Consequently, also, he can always keep a job and make a better living for himself and his family.

With a bow to Webster, one might define management as the art of getting things done, faster, better and at a lower cost. Things produced and services rendered are, after all, the important items in raising individual and general standards of living—not money as such. This is not to dismiss money as nothing but it is to say that money to mean anything must represent work done and things produced. Otherwise, money has little or no buying power.

Assume, for example, that there was no coal production at all. All the paper \$1,000 bills a man could get his hands on wouldn't enable him to get even a pound. The bills might be stacked up and set on fire, but a pile of coal the same size would provide a lot more heat and comfort.

To get at the answer another way, assume there are two men at work, one raising and preparing the eats and another providing the tools, furniture, clothing and other manufactured articles. So that they could

trade products at convenient times, the two would use counters they would call "money." Together, the two men would provide enough to eat, to use and to wear, meaning that they would live comfortably. If they exercised good management and increased their production, they would have more food to eat and more things to use and wear. Consequently, they would both be better off. In other words, by increased production, they would raise their standard of living, especially if they developed new machinery and new methods to get more for the same or less labor.

Looking at it from the other angle, what would happen if one guy got a bee in his bonnet and decided money was the real thing and that he would be better off if he took it easy, did not produce as much and got more of the available cash? Since his production would be less, there would be less to divide between the two, whether it was food, clothes or what have you, and consequently both would be worse off, even though there still was as much money kicking around.

This little essay on money vs. production makes it clear, therefore, that a rising standard of living can be attained only when more things are produced more efficiently. The manager is a key figure in that goal. He mixes men, equipment and methods, and coordinates and directs their efforts, to get out more production per hour of effort expended. There is where his real opportunity lies—not only in raising the general standard of living but his own as well.

Now that the manager's business and his objectives have been outlined, more or less, it is in order to consider ways and means. In other words, what does the foreman—or other manager—have to work with? How does he go about it? Looking the field over, it appears that there are two main things the manager has to do with:

1. Machinery and materials.
2. Men.

Machinery, by multiplying a man's muscle power, enables him to produce more. When he produces more, he lays the foundation, as previously

pointed out, for a better living. One of management's functions, therefore, is to keep close track of developments in equipment and materials and adopt new types when they will show the necessary cost saving. True, not all managers, including foremen, have a direct voice in purchase of new equipment. However, all foremen are directly concerned with another vital problem in the use of machinery—getting the most out of it per shift and per man employed. Once the investment has been made, the returns depend very largely upon the foreman. It is his job to clear the way for the machine and for the crew, so that both can produce at the maximum rate, thus keeping the cost down and improving the sales position of the mine, with consequent better working time and earnings for both himself and his men, as well as the investors whose money made his and their jobs possible.

Putting it another way, getting more out of equipment is a matter of finding and eliminating bottlenecks. These bottlenecks may be either physical lack of changing switches, (for example) or human (an indifferent attitude toward their jobs on the part of men).

Failure to install changing switches already has been mentioned as one handicap in attaining maximum unit production. Others largely or completely under the control of the foreman include failure to keep track of supplies; poor timbering practices resulting in falls with attendant hazards and loss of productive time; bad shooting, forcing machines or hand loaders to waste time in digging; inferior wiring; failure to keep substations up; poor maintenance and abuse of machines, running up repair cost and increasing down time; and many others. The answer is careful, continuous study of what is going on in the section. Such study clearly shows the steps that need to be taken, and is an integral part of management.

Men, as noted, are the second big ingredient in the managerial pie. In some ways, men are the most difficult. Men don't come standardized like machines. And men get ideas and notions, while machines can't. But a machine will work at a certain rate and no more, while men, when they know the job and have the incentive, can do practically anything.

In dealing with men, experience has proved the value of the Golden Rule;

MINE LUBRICANTS

MARATHON

MINAX COMPOUND



PUTS MORE "ROLL" INTO MINE CAR WHEELS

See how many extra tons per trip you haul with Minax on the job. For the high lubricating quality of Marathon Minax Compound reduces the wheel-bearing friction that steals power from your motor.

And watch Minax cut lubricating costs... maintenance costs, too. For Minax lasts longer, wheel bearings need less frequent lubrication. And it protects bearings against excessive wear and corrosion. Marathon Minax Compound is easily handled in either hand or power grease equipment. Available in three weights—for roller, ball or plain bearings.

For further details on Minax, as well as information on other Marathon Mine Lubricants, write, wire or phone.

A COMPLETE LINE OF MARATHON LUBRICANTS FOR
EVERY OPERATION IN YOUR STRIP OR SHAFT MINE



THE OHIO OIL COMPANY

Producers of Petroleum since 1887

GENERAL OFFICES: FINDLAY, OHIO • District Offices: Robinson, Ill., Indianapolis, Ind., Louisville, Ky.

"Twenty Questions" for Foremen

1. Do you handle complaints as they come, without reference to the past,

OR, Do you keep a record of complaints and study them for chronic sore spots that may be your own fault?

2. Do you make snap decisions in handling your men,

OR, Have you shaped a policy, based on experience, common sense and the type of men in your crew?

3. Do you put a complaint out of your mind after you've settled it,

OR, Do you check up on the effectiveness of your settlement and on the feelings of the man you dealt with?

4. Do you wash your hands of a complaint after it is carried beyond you?

OR, Do you find out what action was taken at higher levels, study your own methods to see what you did wrong and then talk to the complainer to show him that you're not nursing a grudge and would like to find a new basis for working together?

5. Do you wait for your men to complain before you correct conditions that clearly are wrong,

OR, Do you stay on the alert to discover conditions that might cause complaints and correct them before somebody gets mad?

6. Do you merely go through the motions of settling a complaint and put the man off with empty promises,

OR, Do you listen earnestly and patiently and then do something real to make him feel better about you and his job?

7. Do you work on the theory that the grievance machinery is enough,

OR, Do you try to lubricate the

machinery with human warmth and understanding?

8. Are you quick to label a man a trouble-maker or a radical if he complains repeatedly,

OR, Do you try to find out what lies beneath his attitude—trouble at home, money worries, poor health, bad eyesight or the wrong kind of job?

9. Do you tell your men that the orders you have from higher up sound stupid to you but that they'll have to do the job anyhow,

OR, Do you follow through on top-level orders that you don't approve of, expressing your feelings and your reasons only to your superiors?

10. Do you settle issues by a hard-and-fast formula,

OR, Do you study your men individually to find out what remedy is most effective for each man?

11. Do you have favorites among your men,

OR, Do you try to make a team of your crew by showing them the stake they all have in doing a good job?

12. Do you try to bluff it out with double-talk when a worker asks a question you can't answer,

OR, Do you tell him frankly that you don't know but will find out and then, as soon as you've got the facts, give him his answer?

13. When other workers are within earshot, do you bawl a man out for making a mistake,

OR, Do you take him aside and, in private, set him straight?

14. Are you satisfied with the way you're doing your job now,

OR, Are you always on the lookout for changes that will turn out more coal without loading undue hardships on your men?

15. Do you discourage your men from talking to you about their jobs and their problems,

OR, Do your men know you as a sympathetic listener when they bring their troubles to you?

16. Do you build up a secret list of shortcomings against a man and then, when you think the list is long enough, throw the book at him,

OR, Do you keep your men informed about where they stand and give them warning each time a mistake is made?

17. Do you put new workers on their own right away,

OR, Do you give them careful instructions, help them through their first run-through and then follow through with frequent check-ups?

18. Do you "give orders" and then leave it to your men to carry them out,

OR, Do you follow your orders by fixing responsibility and explaining why, where, how, when?

19. Do you wait until an emergency occurs and then improvise a way to meet it,

OR, Do you plan ahead for emergencies by keeping up to date on the mine plan, the location of tools, equipment and controls and the availability of escapeways?

20. Do you go it alone, assuming that your way is the best way and the only way,

OR, Do you seek out ideas from other foremen to improve your own methods and fit your plans into the over-all production pattern?

If you have answered "Yes" to the second part of each question above, you are acting in accordance with generally accepted principles of good foremanship.

In other words, the best results are attained when the foreman handles his men as he himself would like to be handled, although this does not mean babying. Firmness is necessary but it should be accompanied by fairness. When a man knows clearly what is expected of him and is convinced that his boss knows his business, he ordinarily will go along the best he can. If he gets out of line through mistake, being logically minded, he will accept and try to profit from correction properly administered. If he is one that likes to try something on his boss to see if he can get away with it, firmness and fairness are the answers. If he deliberately refuses to do his job after he has had his chances, the remedy is clear.

While much more could be written about handling men, some of the

points that authorities consider important are set forth in the accompanying "Twenty Questions" for Foremen." In addition, the foreman interested in improving his production should carefully study the question of incentives. The cash incentive is not the only one, although, by pointing out what efficient production means in better sales, more days of work and more money per year, the foreman can put this ingredient to work quite effectively. Other incentives equally or more powerful arise out of two very human characteristics:

1. The desire to excel.

2. The desire for recognition.

Very few men are willing to concede that they can't do as well as the other guy. This applies to producing coal as well as to playing poker. Consequently, by getting a little com-

petition going, the foreman can stimulate interest and increase his tonnage. Also, most men like to be patted on the back and praised a little once in a while, and are willing to put forth a little extra effort, as a rule, to be singled out for public commendation. So the wise foreman does not forget, when a man is doing good, to say so—and to pass the word along to his superiors, who might also want to add their congratulations.

More efficient production—more goods for the same or less labor—is, to repeat, the key to a better living for everybody—worker or manager. The foreman, by striving to better himself in the art of management, stimulates increased efficiency, thereby making himself more valuable and raising not only the general standard of living but his own as well.

you get more work out of Mack Trucks



Built-in durability plus exclusive features of design explain the stand-out performance of Mack super-duty trucks on punishing coal stripping operations. Mack Model LR, specially engineered for this service, is proving to cost-conscious mining men that a Mack on the job means more work done on the job.

because...we put more work into Macks



Mack trucks for off-highway service take the toughest terrain in stride. Whether it's uneven ground, slippery mud or sand, Mack's exclusive Power Divider assures good going by effectively transferring power to the wheel having the best traction. Two distinct types of the Power Divider are available, one for four-wheel trucks (shown here) and another for six-wheelers.



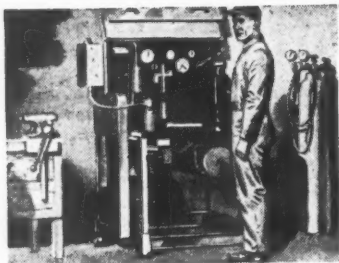
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Mack Trucks, Inc., Empire State Building, New York 1, New York. Factories at Allentown, Pa.; Plainfield, N. J.; New Brunswick, N. J.; Long Island City, N. Y. Factory branches and dealers in all principal cities for service and parts. In Canada, Mack Trucks of Canada, Ltd.

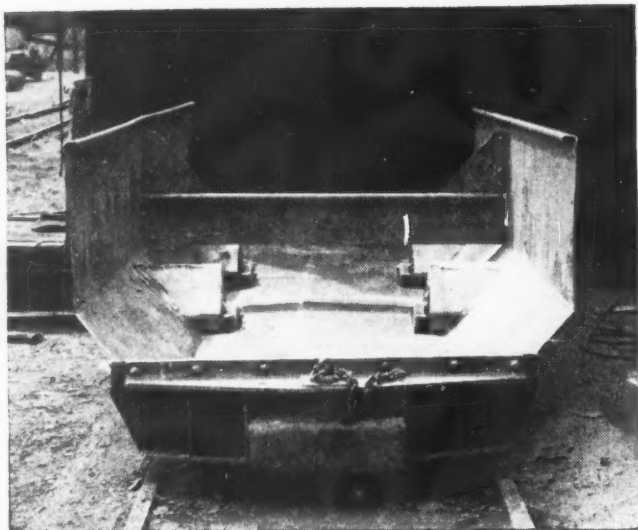
6219-3

SINCE 1900, AMERICA'S HARDEST-WORKING TRUCK

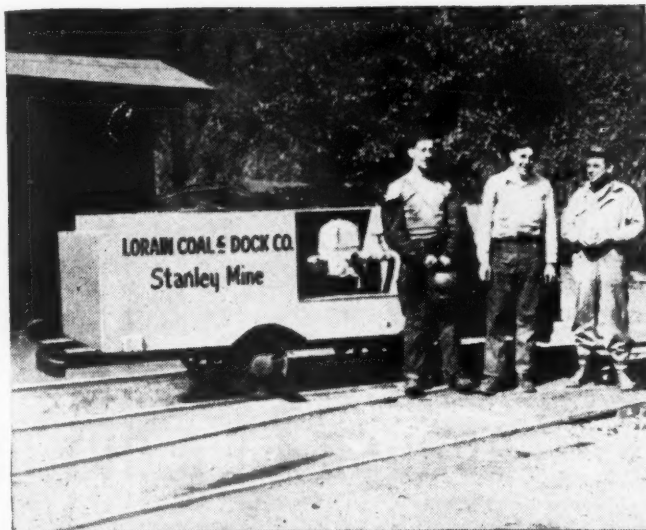


Operating Ideas

Old Mine Cars Rebuilt for New Uses



NEW SUPPLY CAR, built from a wrecked drop-bottom car, has a solid bottom and open ends.



FIRE CAR, built on trucks of old car, is kept close to the working face for emergency.



TIMBER CAPACITY of open-end steel car is four times as great as that of old-type cars. Unloading also is easier and faster with these rebuilt cars.

NOT ALL MINE CARS battered by long use or wrecked are discarded at the Stanley and Blaine mines of the Lorain Coal & Dock Co., Columbus, Ohio. Wide-awake shop men at these two mines are putting such cars to new uses, rebuilding them as supply cars or as fire cars.

At the Blaine mine, three wrecked steel drop-bottom cars have been torn down and rebuilt as supply cars by the shop crew. First, the frames were

straightened and the ends were cut out. Then the drop-bottoms were replaced with solid bottoms. Finally, the cars were repainted and made ready for use. The new supply cars, shown empty and loaded in the accompanying photographs, make easier and faster unloading and have larger capacity than the old wooden cars. For example, one of the new cars can carry approximately four times as many posts as an old-type supply car.

Three of these new cars already have been built and three others are planned, as well as two new all-steel rail trucks. These eventually will replace all the old-type wooden supply cars at the Blaine mine. Plans also are under way to construct five or six of the new cars for the Stanley mine.

At the Stanley mine, a new fire car has been built on the trucks salvaged from an old mine car. The body was designed and built entirely in the mine shop. Of steel construction, the fire car carries a tank of 800-gal. capacity. A double-plunger type pump installed in the center, and shown in the accompanying photograph of the car, is capable of making approximately 100-lb. nozzle pressure at the end of 400 ft. of 2-in. fire hose.

The car carries 400 ft. of 2-in. hose, one 2-in. nipple, a 12-in. pipe wrench, one 10-in. crescent wrench, one 2-in. high-pressure nozzle and 20 ft. of suction hose. The suction hose is used to pump water from another water car placed behind the fire car. There is also a fog nozzle, which is of great value in breaking up fog arising from the fire when water is placed on it. The fire car can be towed by any type of mine locomotive in the mine and is designed to travel into any part of the mine. A similar car was built a year ago at the Blaine mine and has been in use there ever since.

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with equivalent steel tonnage

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HIGH-TENSILE STEEL



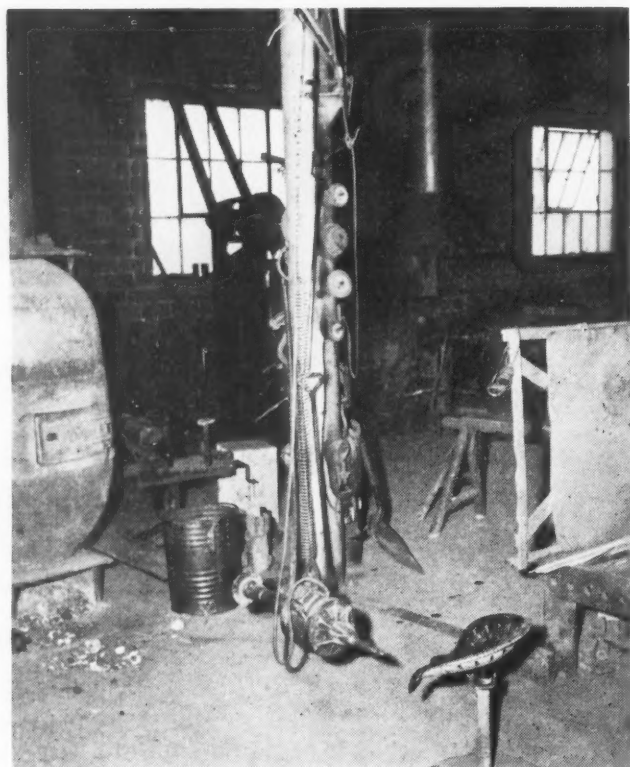
You can begin to balance your production with demand by making more units per ton of steel. Less steel per unit is made possible by the extra strength of J&L OtiscoLOY High-Tensile steel. This saving in dead-weight over products made of carbon steel has been used to advantage by many manufacturers who reduce the steel per unit 25%, increase their unit production 33%. Write for full information.

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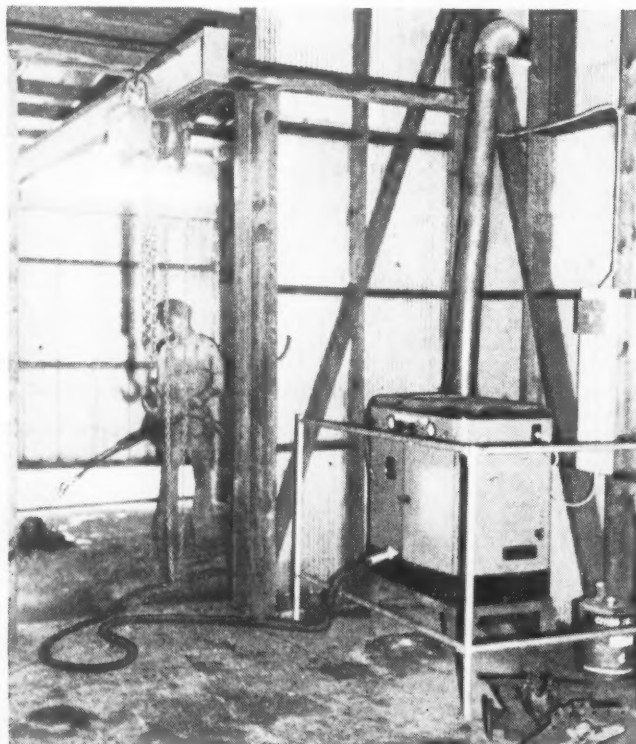
PITTSBURGH 30, PENNSYLVANIA

Spring-Suspended Grinder

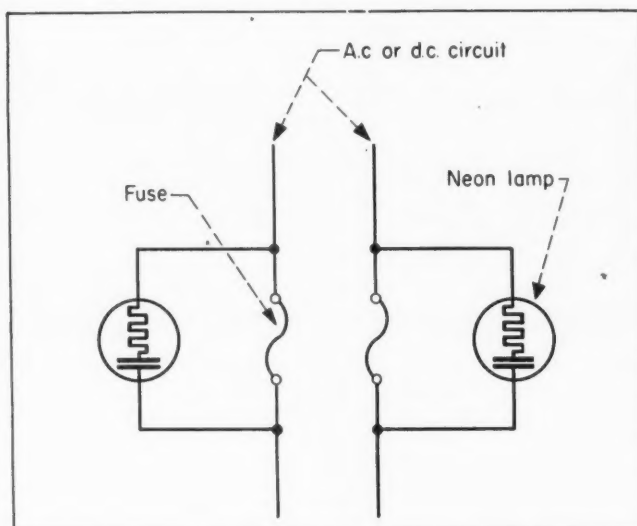


GRINDER is suspended on a spring for safety and ease of handling. Abrasive wheels are racked on a nearby column.

SUSPENDING A GRINDER or drill on a steel spring, as shown in the accompanying illustration, cuts worker fatigue and insures against damage to the machine by dropping in the shop of Mine No. 18, Pittsburg & Midway Coal Mining Co., West Mineral, Kan. A handy portable seat also is provided for the comfort and convenience of the operator.



Neon Lamps Spot Blown Fuses



HOW NEON LAMPS can be installed to indicate blown fuses on a simple two-wire circuit.

NEON-GLOW LAMPS can be used as an indicator for detecting a blown fuse on either an a.c. or d.c. circuit, writes Paul C. Ziemke, Oak Ridge, Tenn.

Neon lamps connected in parallel with fuses, as shown in the accompanying illustration, offer a means of identifying blown fuses. They have an advantage over filament lamps, because of their lack of delicate filaments, resulting in greater reliability, extremely small current consumption and long life. The units are small and do not require much room for mounting.

Power consumption for one type of neon lamp available for a 105-125-volt circuit is only two watts. The lamp is $3 \frac{5}{16}$ in. long and its medium screw base has a ballast resistance of 3,500 ohms. Electrodes consist of half-round plates which start to glow on 60 volts a.c. or 85 volts d.c. The average life for the lamp is 3,000 hr.

On d.c., only one half of the electrode assembly glows, says Mr. Ziemke, and, on 60-cycle a.c., both glow steadily.

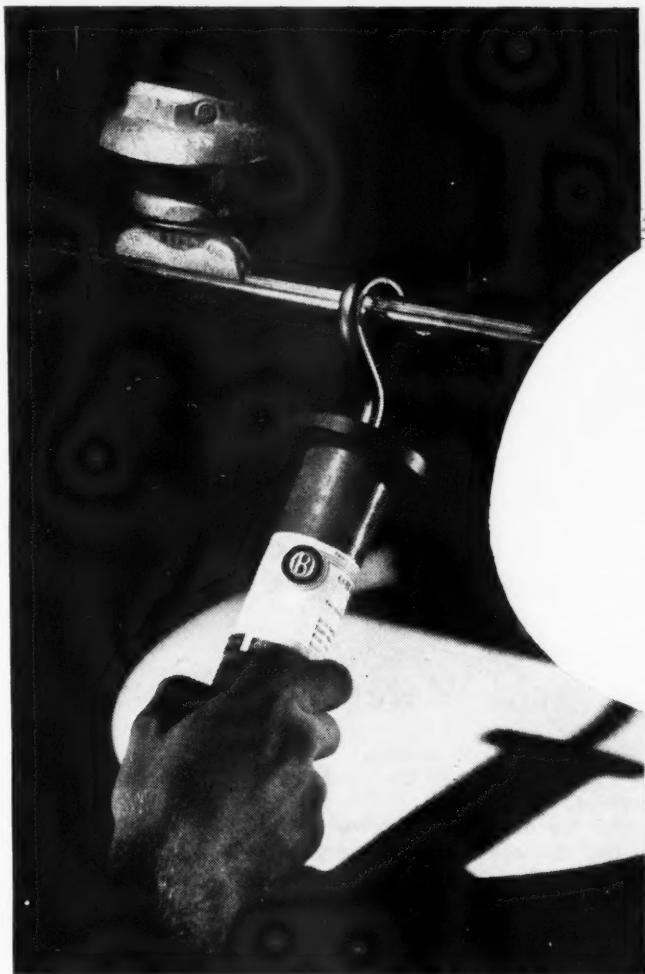
Machines and Parts Cleaned in Shop

THOROUGH CLEANING for machines and parts is provided by a Kerrick Cleaner installed in the new central shop of the DeBardeleben Coal Corp., Sipsey, Ala., which serves both deep- and strip-mining equipment. The cleaner, located in one corner of the building and shown in the accompanying photograph, supplies steam at 90 lb. pressure through a hose to the cleaning room, seen in the background. There a shop worker directs steam through a nozzle on whatever is to be cleaned.

Steam is generated in 59 sec. after power is turned on, it is said. A chain hoist mounted on an overhead track makes it easy to move parts into and out of the cleaning room. Addition of a vapor compound to the tank makes it possible also to remove paint. Cleaning off accumulated dirt and grease, as well as paint, makes repairs easier and sends shiny machines back to the mines.

The Kerrick Cleaner is manufactured by the Clayton Mfg. Co., Alhambra, Calif.

DIRT AND GREASE, as well as paint, are removed by steam in a special cleaning room attached to the shop.



Spending Dimes to Save Dollars!



Each dime you spend for O-B Fused Trolley Taps will safeguard many dollars of expensive cables, machine motors and production time. Cable burnouts cost money. So do motors damaged from overload. The simple fuse protection of an O-B Trolley Tap can prevent both. In addition, production shut-downs caused by burned out cables and overloaded motors will be eliminated.

Strong and ruggedly built, O-B Fused Trolley Taps have only four major parts—a fuse, two end terminals and an enclosing case. They weigh but slightly more than two pounds each and are available with four different types of wire attachment ends. Fuse ratings range from 3 to 400 amperes. If you are not already using O-B Fused Trolley Taps, order some today. The small price you pay is but a fraction of the value of the equipment they safeguard.



2833-M

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Canadian Ohio Brass Co., Ltd., Niagara Falls, Ontario

TIGHT GRIP—Get good return circuit connections with O-B Plier-Type Ground Clamps

Provide perfect mechanical and electrical connections. Strong spring-kept jaws afford tight grip unaffected by twisting or vibration. May be attached to either bond cable, rail base or negative feeders as large as 1,000,000 cir. mil.



UNDERGROUND OPERATION of the rubber pipeline for handling acid water is checked by Robert Featheringham, superintendent, Wolf Run mine, Warner Collieries Co., Amsterdam, Ohio.



DISCHARGE END is at the top of a 300-ft. air shaft. Use of the air shaft, made possible by vertical suspension of the pipe with steel cables, cut 220 ft. from the route of the metal pipe.

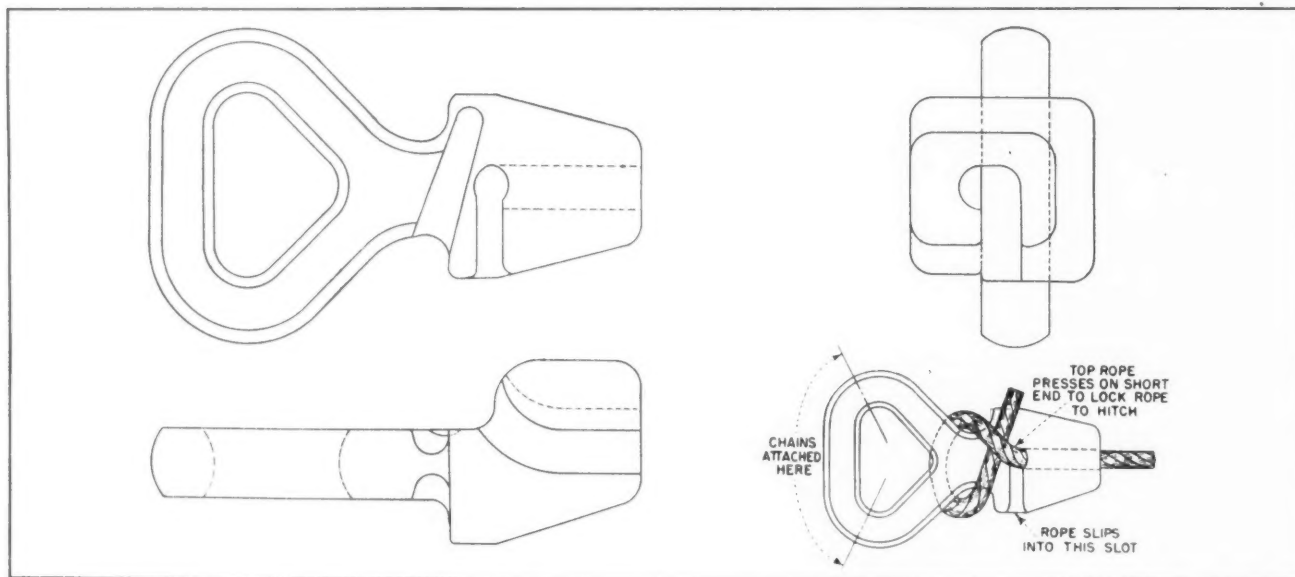
Rubber Pipe Handles Acid Water

RUBBER PIPE, developed by the manufacturer to conduct corrosive chemicals, has successfully replaced a 600-ft. metal pipeline for handling acid water at Wolf Run mine, Warner Collieries Co., Amsterdam, Ohio. The water is of such high acid content that conventional pipe was perforated within two weeks, according to Robert Featheringham, superintendent of the operation.

Following appearance of the water some 18 months ago, seeping into the main entry from abandoned workings, a pump and 600 ft. of metal pipe were installed, but replacement proved costly and installation of the rubber pipe followed. This pipe, manufactured by the mechanical goods division, Goodyear Tire & Rubber Co., Akron, Ohio, and known as "Diversipipe," is commonly used as

a pipeline subject to electrolysis and corrosion and as a conduit for abrasive in the sand, gravel, cement and salt industries. The tube of the pipe is especially compounded for chemical-corrosive service and is reinforced with multiple plies of fabric and a helix of high-tensile steel wire.

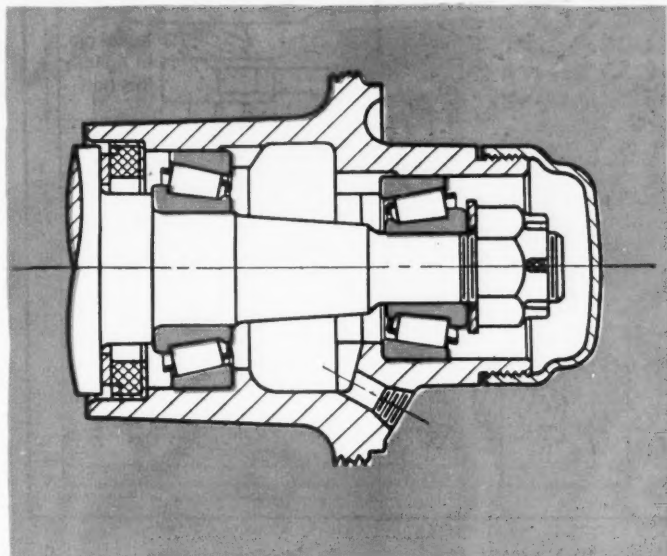
At Wolf Run, the pipe was installed in a single line of eight sections, totaling 380 ft. and running from the pump up through an air shaft to discharge on the surface. Its flexibility permitted use of the air shaft, shortening the old line by 220 ft. An unusual feature of the installation, devised by Goodyear engineers, was vertical suspension of the 4-in. Diversipipe, which was supported on both sides by parallel steel cables.



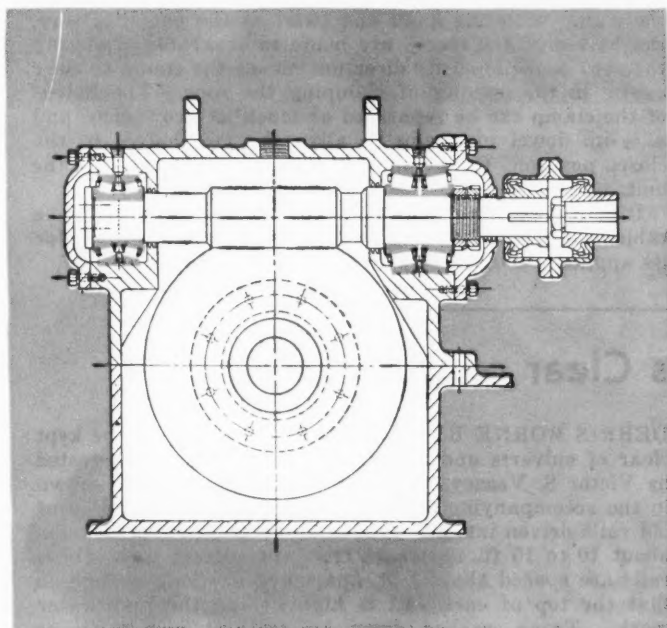
Tail-Rope Hitch for Scrapers

THIS TYPE OF TAIL-ROPE HITCH is used at the Climax Molybdenum property, Climax, Colo., according to Engineering & Mining Journal. Two chains mounted on the rear of the scraper are attached to the large opening in the hitch. The tail rope is attached to the hitch as shown above. No clevises or other devices are necessary to make the attachment. A 1 1/8-in. cable may be changed in a few minutes without tools. When the rope is pulled tight by the scraper-hoist, the short end of the rope is locked securely in place.

How to carry combinations of radial and thrust loads



TRACTOR FRONT WHEEL in which both thrust and radial loads are carried on single row Timken bearings. From whichever way the load may come, it will be handled with minimum friction and wear.



APPLICATION of Timken Bearings on the worm shaft of a worm gear drive. The load on the worm shaft bearings, due to the operation of the worm, is primarily thrust. There is considerable radial load however, arising from the separating force of the gears and also possibly from over-bung driving loads. This is another application for which the tapered roller bearing is ideal.

THESE drawings show how Timken tapered roller bearings are effectively used where both radial and thrust loads must be carried. They may give you an idea for projects now on your boards.

Because it is a *roller* bearing, the Timken bearing can carry the heaviest loads. Because its rolls are *tapered*, it can carry both radial and thrust loads in any combination.

From whichever direction the loads may come, this tapered design enables the Timken bearing to carry them, one at a time or simultaneously. The cost of providing a separate type of bearing for each load is eliminated. Bearing housings and mountings are simplified, with a saving in cost, weight, and space.

For help in putting these important advantages of Timken bearings to work in the product you're designing, call upon the confidential service of the Timken engineer. He will help you select the precisely correct bearing for your job.

Remember, Timken is the only bearing manufacturer which makes its own steel. And Timken is the acknowledged leader in: 1. advanced design; 2. precision manufacture; 3. rigid quality control; 4. special analysis steels.

Additional copies of this page and further information on this or other applications of Timken bearings are yours for the asking. Write — The Timken Roller Bearing Company, Canton 6, Ohio.

TIMKEN GIVES YOU THESE IMPORTANT FEATURES:



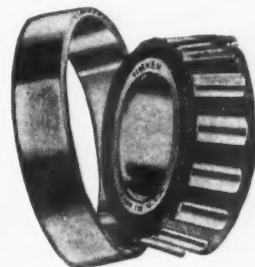
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All lines drawn coincident with the faces of rollers, cone and cup meet at a common point on the axis of the bearing.

2. GREATER LOAD CAPACITY

Load is distributed along full length of roller, giving greater capacity, precision, and rigidity, with less wear and distortion.

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ROLLER BEARINGS**



NOT JUST A BALL ○ NOT JUST A ROLLER □ THE TIMKEN TAPERED ROLLER □ BEARING TAKES RADIAL AND THRUST LOADS OR ANY COMBINATION

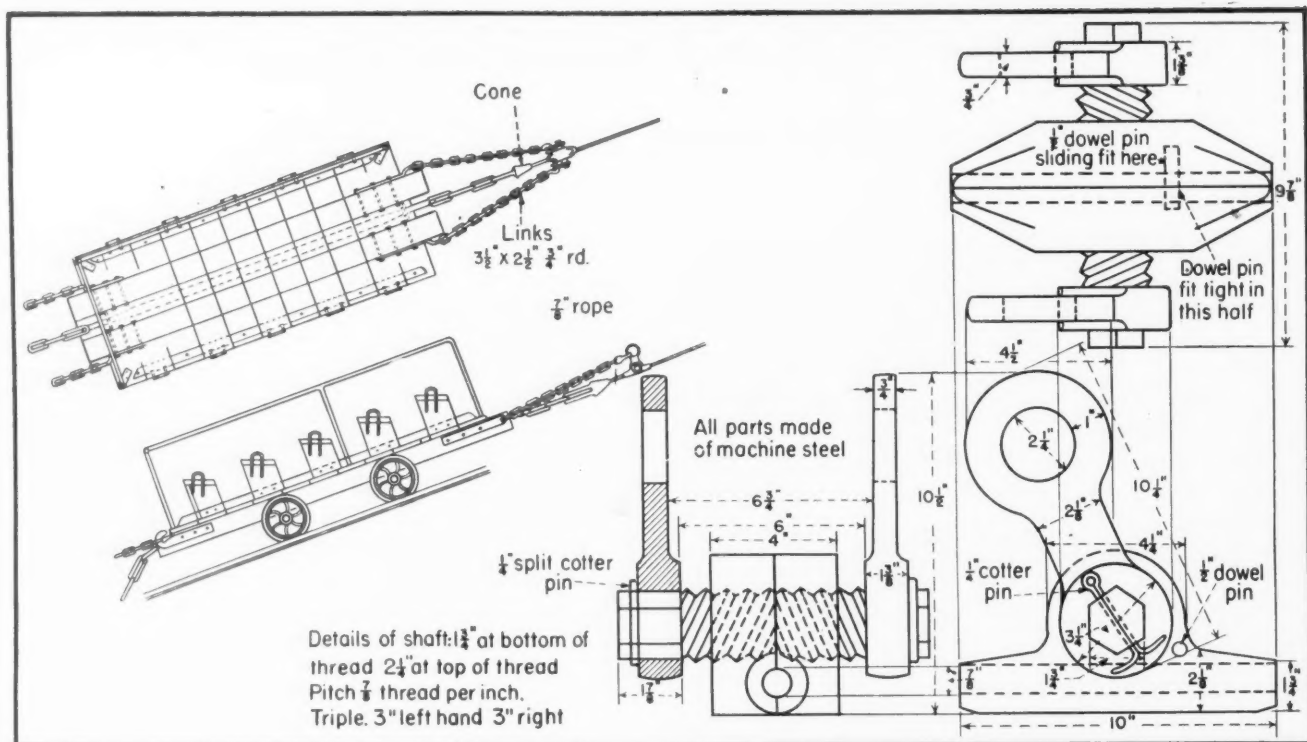


FIG. 1—HOW THE SLOPE ROPE SAFETY GRIP and attachments are made and installed on the man-trip cars.

Safety Grip Protects Car Hitching

A SAFETY-GRIP ASSEMBLY is used as a safeguard against a broken hitching on a two-car man-trip, operating on a 2,000-ft. 20-deg. slope, writes A. Caffaro, shop foreman, Canmore Mines Ltd., Canmore, Alberta, Canada.

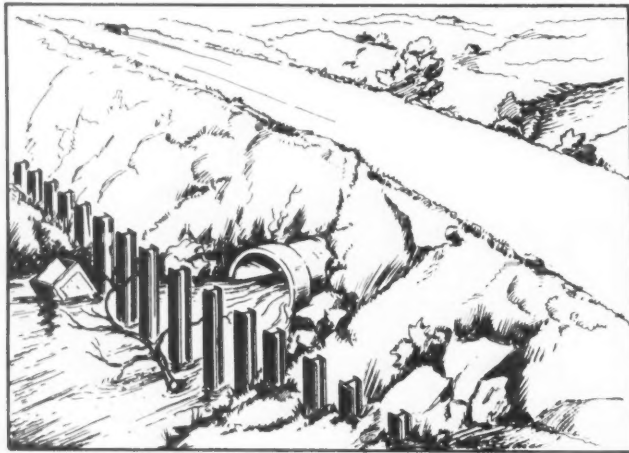
The safety-grip assembly, shown in the accompanying illustration, consists of a vise-like cable grip with two safety-chain connections to the car bumpers. Grips have been fashioned after the one shown for cable diameters up to 1½ in.

The ingenious clamp that grips the hoist rope consists of two ears keyed to the extremities of a short shaft. Half of the surface of the shaft, between the ears, is threaded with a left-hand thread, and half with a right-hand

thread. Over the threads travels the safety clamp or grip, really a split nut, which grips the hoist rope. By holding the clamp with one hand and twisting the ears one way, the halves of the clamp are made to separate. Twisting the ears in the opposite direction causes the clamp to close again, in the manner of clamping the rope. The halves of the clamp can be separated as much as two inches, and a 1/2-in. dowel pin helps to align the two halves in the closed position. Cotter pins prevent the disassembly of the unit.

It takes less than 30 sec. to apply the safety grip to the cable, says Mr. Caffaro, and no tools are required for its application or removal.

Rails Keep Culverts Clear of Debris



PICKET FENCE of old rails upstream from culvert blocks trash in floods and keeps culvert clear.

DEBRIS BORNE BY FLOODS and freshets can be kept clear of culverts and pipes by an arrangement suggested by Victor S. Veazey, Pratt, W. Va. The method is shown in the accompanying illustration, which displays a line of old rails driven into the ground and the bed of the stream about 10 to 15 ft. upstream from the culvert pipe. These rails are spaced about 1 ft. apart and are long enough so that the top of each rail is higher than the high-water mark. Trash washed down by freshets and floods is caught and held by the line of rails and the culvert is thus kept clear.

A Forum for Ideas

IF THIS SECTION has ever benefited you, remember that other mining men might find your pet idea helpful too. So why not send us your operating, mechanical, electrical or safety ideas for publication. If acceptable, Coal Age, on publication, will pay you \$5 or more each.

frictionless as fluid drive

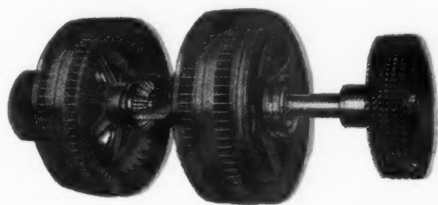
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The New P&H Magnetorque Swing

Power for swing and propel transmitted by electro-magnetic forces. Operated by small generator on main engine; controlled from operator's station. Swing motions, slow or fast, have cushioned acceleration and deceleration. Because there is no friction swing, there are no friction problems. One more in the long list of P&H Added Values.

Wherever you find the P&H Model 1055 on the job, you'll hear owners singing its praises for the new Magnetorque swing which marks the end of swing friction trouble and costly maintenance.

No Friction . . . No Friction Problems

The new Magnetorque solves the problems of old style swing clutches . . . by completely eliminating friction.

Without mechanical linkage . . . without friction . . . without wear — the Magnetorque transmits power for both swing and propel motions — and does it better.

Makes Production Purr

Because it's smoother, faster, more responsive . . . because it permits quicker, more accurate stops and starts — the Magnetorque swing cuts wasted operating time, increases daily production and lowers yardage costs.

The Swing of a Lifetime

The Magnetorque is built to last the life of the machine. And during this time not so much as a single hour will be required for its repair, replacement, or maintenance.

It's one of the most important improvements in the past twenty-five years . . . users all over the country say so . . . performance has proved it. Write for complete information.

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				Philadelphia 2	Scranton 3

News Round-Up



Fuel Oil Crisis Mounts; Officials Cite Dangers

Shortages of fuel oil and gas, already alarming before the end of the year, grew more critical as severe January weather plagued the East and other sections of the nation with snow, sleet and low temperatures. City, state and federal officials moved desperately to assure minimum needs for homes, public utilities and industries in the face of the fuel-oil deficit.

Federal officials Jan. 28 authorized the oil industry to pool its supplies to ease the situation and pledged exemption from anti-trust proceedings. Earlier, on Jan. 15, at a conference of emergency fuel coordinators, Interior Secretary Krug, predicting the shortage might last three years, called for a 15 percent voluntary cut in consumption of fuel oil, gas and gasoline, urged a six-point conservation program on users and asked Congress for power to ration gasoline, oil and coal and clamp price ceilings on these products.

Meanwhile, in the Midwest, some automobile plants and other industries halted and more than 200,000 workers were idled when natural gas supplies ran low late in January.

Northeast Hard Hit by Cold

In New York State, Gov. Dewey, Dec. 30, set up a state-wide organization to handle the fuel-shortage problem and later joined New York City officials in a plea for more coastwise oil tankers. In New York City, a spokesman for fuel dealers, citing a degree-day increase of 30 percent over last winter plus a 23 percent drop in fuel-oil supply, declared Jan. 11 that No. 6 fuel oil was 40 percent short of needs.

Earlier, on Dec. 29, representatives of federal agencies met in Washington to study the conversion of some government heating plants from oil to coal. This was followed later in January by Secretary Krug's warning before the Senate Banking Committee that anyone who installs an oil heater today does so at the risk of not being able to get supplies.

The long-term view was little if any better. Secretary of Defense James Forrestal told a House Armed Services subcommittee that grave concern was felt in high military quarters over the strategic oil supply and the

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possibility of loss or interruption of the heavy flow of oil from the Near East to this country. He estimated that a war emergency would nearly double maximum military requirements over those of the recent war and would push military and civilian needs 2,000,000 bbl. a day above predictable U.S. production.

Increased consumption was to blame for the acute oil shortage, according to Max W. Ball, director, Oil and Gas Division, Department of the Interior. Per capita consumption has risen from 367 gal. per year in 1938 to 608 gal. at present, with total consumption in the United States now greater than world consumption in 1938, he declared. Mr. Ball pointed out also that there now are 7,000 fewer tank cars in operation than during the war.

Although little could be done to ease the current shortage except conversion to coal and such pooling of oil supplies as the oil industry was able to effect, industry and government laid plans for long-range improvement of the situation. The Pittsburgh Consolidation Coal Co. announced Dec. 24 that construction of a \$1,000,000 pilot plant, the first step in a \$120,000,000 coal gasification project planned jointly with the Standard Oil Development Co., would be started early in 1948. The pilot plant will be able to convert 6,600,000 tons of coal annually into gas, gasoline or fuel oil. On Dec. 31, Brehon Somervell, president, The Koppers Co., Inc., stated that his company expected to devote a considerable research budget to synthetic fuels and chemicals from coal.

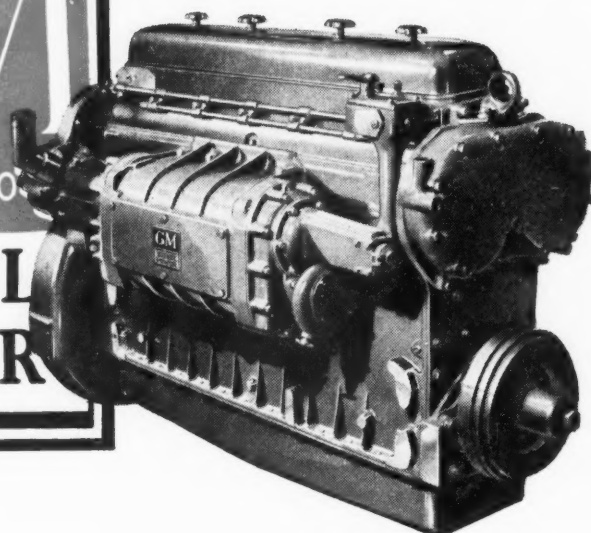
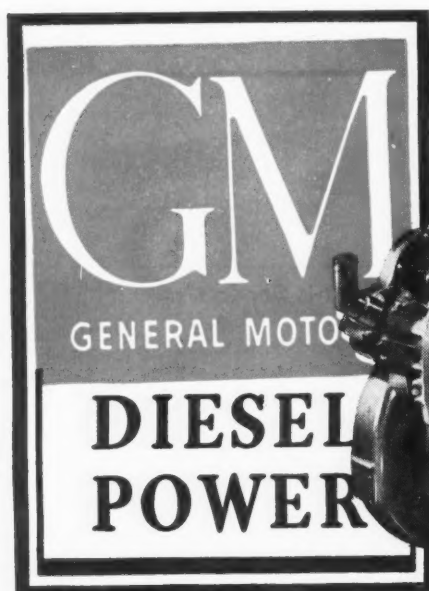
Along these same lines, Standard Oil Co. (N.J.), Jan. 12, dedicated a

new laboratory at Baton Rouge, La., for developing processes to produce synthetic fuels from natural gas and coal. Company officials cited the higher costs of finding and producing petroleum, added transportation costs and the needs of national defense as factors in the development.

On the government side, although President Truman's new budget, submitted to Congress on Jan. 12, recommended only \$9,750,000 for continuation of the Synthetic Liquid Fuels Division, Department of the Interior, agency officials took hope from a new bill recently introduced that would extend the division's life until 1952 with an appropriation of \$30,000,000 for further research, development and demonstration operations. Later, on Jan. 19, Secretary Forrestal bolstered the bill's chances with his proposal for a synthetic-fuel industry with a capacity of 2,000,000 bbl. a day. Government scientists contend that there are only two possible ways of getting such an industry started: government-built plants operated by private industry or government subsidies to enable private industry to build its own plants. They predicted that construction of plants with a capacity recommended by Secretary Forrestal would cost up to \$9,000,000,000.

Krug Seeks Advisory Council

On Jan. 19, Secretary Krug invited bituminous industry leaders to meet in Washington Jan. 27 to consider forming a liaison council between the industry and government to advise on temporary fuel shortages, other emergencies and long-term economic and technical developments. Those invited to attend were: O. L. Alexander, Pocahontas Fuel Co., Inc.; H. B. Baird, Eastern Gas & Fuel Associates; J. R. Chandler, Pickands, Mather & Co.; I. N. Bayless, Union Pacific Coal Co.; H. S. Clark, Rochester & Pittsburgh Coal Co.; Irvin Davis, Hatfield-Campbell Creek Coal Co.; H. T. DeBardeleben, DeBardeleben Coal Corp.; J. D. Francis, Island Creek Coal Co.; L. Ebersole Gaines, New River Coal Co.; R. P. Koenig, Ayrshire Collieries Corp.; G. H. Love, Pittsburgh Consolidation Coal Co.; E. C. Mahan, Southern Mining Co.; J. W. Morgan, C. A. Hughes & Co.; H. M. Moses, H. C. Frick Coke Co.; Charles O'Neill, United Eastern Coal Corp.; G. W. Reed, Peabody Coal Co.; H. G. Schmidt, North American Coal Corp.; K. A. Spencer, Pittsburgh & Midway Coal Mining Co.



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GM Diesel owners—are GM Series 71 Diesel distributors, dealers and service men all ready to answer a call and see that every engine gives its best. They have the tools, the know-how and a real interest in keeping your engine dependably on the job without interruption.

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TRACTION to move it!**

**Open-pit hauling requires
the 100% Traction provided
only by Walter 4-Point
Positive Drive***

A "heavy-duty" truck that spins and churns its wheels helplessly in mud, soft dirt, snow, slippery surfaces or steep grades, has limited value in high-tonnage, strip mine hauling.

You need the great delivered power and unfailing traction of Walter Tractor Trucks to move

huge loads (30 to 60 tons) from shovel to dumping point . . . without bogging down when the going gets tough. Walter Tractor Trucks give you all-weather, all-surface, all-season hauling ability that keeps going when conventional 2 and 4-wheel drive trucks are helpless.

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lose traction, power is automatically concentrated on the working mates. No power is wasted on helpless, spinning wheels—no bogging down on soft or slippery surfaces.



Continuing Report on
SEPARATION PROCESSES by GRAVITY DIFFERENCE
for Coal Preparation

1947 marked important expansion of the coal preparation processes offered by Cyanamid and substantial progress in testing activities on these processes. During the year, 12 new Heavy Media Separation plants were started or contracted for and engineered. Of these, one will treat bituminous coal and two will treat anthracite.

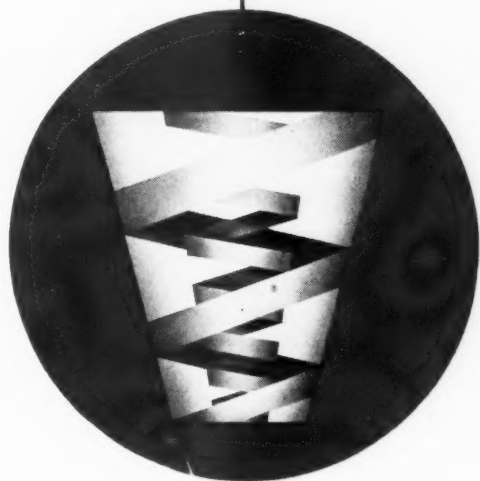
Now more than ever before, Cyanamid can supply a preparation process for optimum results at low operating and low capital costs . . . whatever your size-range and specification may be.

1948 is the year in which many mines will determine their destiny for a decade to come by adding or modernizing preparation processes to deliver "specification fuel" . . . thereby capitalizing fully on their investment in full-seam mechanized mining equipment and protecting against the eventual return to sharply competitive markets.

Cyanamid is staffed and equipped to help preparation engineers meet these challenging opportunities for better coal cleaning through Separation Processes by Gravity Difference.

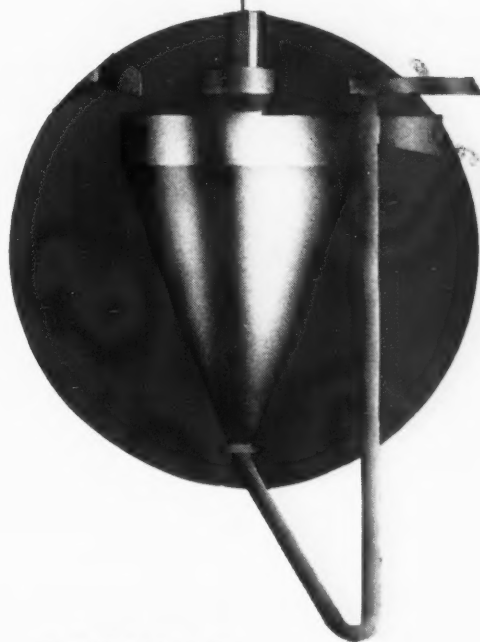
DUTCH STATE MINES CYCLONE SEPARATOR

Unique processes which promise important additions to the technology of coal preparation by gravity difference in the size range $\frac{1}{4}$ " x 0, on either anthracite or bituminous. Small size, unusual capacity and utter simplicity of the separating equipment and its ingenious utilization of centrifugal and centripetal forces are inherent advantages. Uses low-cost magnetic medium, with provision for continuous, automatic medium recovery. Commercial size, continuous unit "cyclone" for testing carload lots now in operation in the Cyanamid Mineral Dressing Laboratory. Considerable test data have been accumulated and results are available to those interested.



HEAVY-MEDIA SEPARATION

Precision cleaning over a full-size range with inherent advantages over previous preparation methods in cleaning coal with a high-percentage of near-gravity material. Extremely accurate on coal with a high and variable percentage of refuse. Functions efficiently at any desired gravity from 1.25 to 3.40 (within ± 0.01) with gravity quickly and easily adjustable as feed-coal changes. Low medium loss because of continuous, automatic recovery of medium. Plants can be designed for multiple-product separation from run-of-mine feed in a full size-range to meet any present or future specification in any market. Equipment is standard and time-proved. Plants can be started or shut down without bank-loss of coal or medium or change in plant efficiency. Labor costs are low.



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With a process for every size and specification, and no self-interest in equipment manufacture or plant construction, Cyanamid offers unprejudiced counsel based on tests of your coal by various preparation processes in the Cyanamid Mineral Dressing Laboratory at Stamford, Connecticut. We invite discussion and stand ready to run carload tests on your coal; to cooperate with engineers of your choice in the design of the most efficient separation units into your cleaning plant, and to provide the practical assistance of Cyanamid Field Engineers in tuning up the installation.

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AMERICAN CYANAMID COMPANY

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USE
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Chain
Drives

Put Whitney Chain Drives to work in your mine operations above and below ground and watch your tonnage and profits increase.

These tough loader, conveyor and drive chains have the built-in stamina needed to stand the severe use encountered in both strip and underground mining. Precision made of heat-treated steel, Whitney Chains have ample strength to keep working under every condition. They resist shock loads without breakage . . . keep equipment operating . . . and cut your maintenance costs by providing exceptionally long wearing life. Whitney Cut Tooth Sprockets complete the overall drive efficiency . . . insure smoother operations.

Standardize on Whitney Chains and Cut Tooth Sprockets . . . the all steel drives . . . and you'll get higher tonnage and more profits. Write for information.

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SINCE 1896

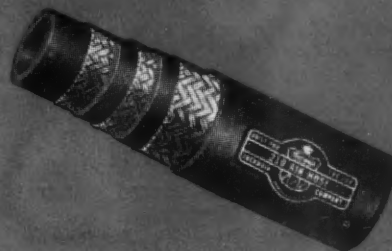
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Thermoid. Air Hose Tailored for the Job!

Three popular types from Thermoid's complete Air Hose Line

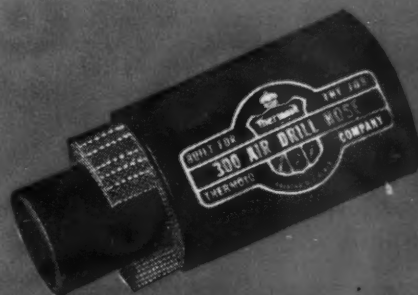
For heavy duty service where oil may be present in the air line, and cover abrasion is severe.

Thermoid #210 Type—Special Neoprene Oil-Resisting Inner Tube reinforced with tough plies of braided yarn, abrasion resisting cover—pressures up to 300 P.S.I. furnished in lengths of approximately 500 ft. in sizes $\frac{1}{4}$ to 1" and approximately 250 ft. in $1\frac{1}{4}$ and $1\frac{1}{2}$ ".



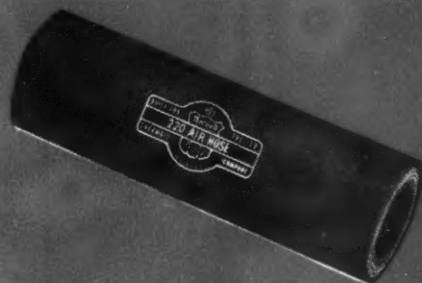
Wrapped construction—for similar heavy duty service where hose is subject to rough handling.

Thermoid #300 Type—Neoprene Tube reinforced with heavy, square woven duck, abrasion resisting cover—pressures up to 300 P.S.I. Sizes $\frac{1}{2}$ to 3" in 50 ft. lengths.



For light duty air connections, blow-out work and similar service.

Thermoid #220 Type—High quality Inner Tube compounded to resist oil, tough cover. Furnished in lengths of approximately 500 ft. in sizes $\frac{1}{4}$ to 1" and approximately 250 ft. in $1\frac{1}{4}$ and $1\frac{1}{2}$ ".



Additional types of Air Hose are available for specific services

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In more than 60 years of working closely with the engineers of industry, Thermoid has developed a *complete* line of Industrial Rubber Products—with the type of construction carefully worked out for every degree of service.

Thermoid distributors carry large stocks of our standard items and always work closely with the Thermoid sales engineers when their customers have special requirements to be met.

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Personal Notes

Earl W. Lamb, formerly general superintendent, has been named general manager, Moffat Coal Co., Scranton, Pa. Before joining Moffat in 1942, Mr. Lamb was general manager of the Penn-Anthracite Collieries Co. from 1931 to 1942. For four years previous to that he was assistant general superintendent of the old Scranton Coal Co.

Edwin A. Weyman, vice president, Markson Coal Co., Inc., Goodspring, Pa., has been elected president of the company, succeeding Anthony Mosolino, deceased.

D. C. Helms, formerly production manager, has been named general manager, Lehigh Navigation Coal Co., Inc., Lansford, Pa. W. J. Parton, formerly a member of the engineering staff, has been named assistant general manager. F. E. Sterner has become mining engineer. R. E. Hobart, mechanical superintendent and associated with the company for 59 years, asked to be relieved of his regular duties and has been named mechanical consultant. W. E. Connor has been appointed to succeed Mr. Hobart as mechanical superintendent. Elwood Rickert has been named superintendent of preparation.

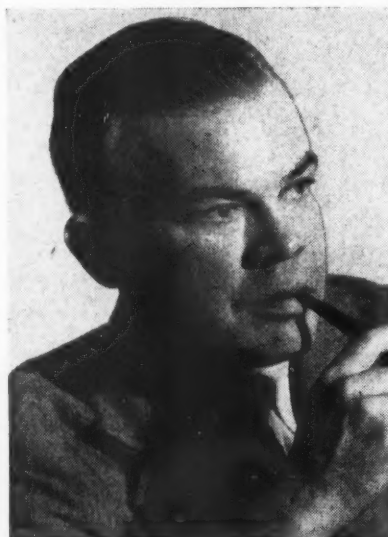
William M. Ritter, general superin-



EUGENE McAULIFFE, 71, retired Jan. 1 as chairman of the board of trustees, Union Pacific Coal Co., Omaha, Neb. Mr. McAuliffe, who for many years has been prominent in industry affairs and highly regarded for his many activities in promoting its objectives, first joined Union Pacific Coal in 1923 as president, becoming chairman of the board of trustees in 1944. From 1917 to 1922 he was associated with the North American Co., organizing and serving as president of the Union Colliery Co. in Illinois. Previously he had held various coal and railroad positions, starting his career in 1888 as a shop apprentice with the Northern Pacific.

tendent, Red Jacket Coal Corp., Red Jacket, W. Va., since April 1, 1947, has been named general manager of the company.

George W. McCaa has been named general superintendent, Fairmont division, Consolidation Coal Co. (W. Va.). Mr. McCaa first joined Consol Jan. 1, 1946, as superintendent of Mine No. 25, Clarksburg, being trans-



EVAN EVANS, vice president and general manager, Lehigh Navigation Coal Co., Inc., Lansford, Pa., has been elected president of the company, succeeding J. B. Warriner, who becomes chairman of the board. Mr. Evans, who first joined Lehigh Navigation more than 35 years ago as a water boy in a breaker, is chairman, coal division, A.I.M.E.

ferred to superintendent, Mine No. 63, Monongah, a year later. He had previously been associated with the Tennessee Products Corp., Eastern Gas & Fuel Associates, T. C. I. & R. R. Co., and Pittsburgh Coal Co.

J. A. Younkins, formerly assistant general superintendent, Duquesne Light Co., Pittsburgh, has joined the Truax-Traer Coal Co. as general superintendent of West Virginia properties, with offices at Kayford, W. Va.

S. J. Craighead, formerly superintendent, Robena mine, H. C. Frick Coke Co., has joined the United States Fuel Co., Salt Lake City, Utah, as vice president and general manager.

Jesse F. Core has been appointed chief engineer, Buckeye Coal Co., Nemacolin, Pa., succeeding A. W. Hesse, who retired Dec. 1 (*Coal Age*, November, 1947, p. 122).

William L. Husk, chief mining engineer, Luzerne Graham Mining Corp., Greenville, Ky., since 1940, has resigned to become assistant professor of mining engineering at West Virginia University, Morgantown. Before joining Luzerne Graham, Mr. Husk, who is a graduate of the University of Kentucky, was chief chemist and preparation engineer for the Elk Horn Coal Corp.

Sam Bates, Benham, Ky., has been appointed a Kentucky district mine inspector, to cover parts of Bell, Harlan and Letcher Counties.

J. T. Pisula has been named superintendent of the Robena, Ronco,

Coal, Business and Industrial Activity

				1948 to This Date	1948 Over 1947, to Date		
Est. anthracite prod., wk. ending Jan. 17.....	1,210,000			2,574,000	—10.7%		
Est. bituminous prod., wk. ending Jan. 17....	13,030,000			31,380,000	— 7.2%		
Source: U. S. Bureau of Mines.							
	Bituminous Coal Stocks (Thousands, net tons)				Consumption (Thousands, net tons)		
	Dec. 1, 1948	Days Supply	Nov. 1, 1947	Dec. 1, 1946	Nov., 1947	Oct., 1947	Nov., 1946
Electric power utilities.....	16,673	65	16,772	14,549	7,737	8,121	6,447
Ryproduct coke ovens.....	8,207	30	7,310	6,355	8,091	8,278	6,992
Beehive coke ovens.....	*	*	*	*	857	965	567
Steel and rolling mills.....	985	34	1,076	877	867	826	799
Cement mills	1,087	45	1,049	1,054	730	704	694
Other industrials	15,147	36	15,682	19,124	12,704	12,310	11,028
Railroads (Class I).....	6,156	20	6,305	7,587	9,167	9,048	8,879
Retail dealers	2,200	8	2,132	2,883	8,010 ^b	7,754 ^b	9,115 ^b
Total	50,455	31	50,276	52,429	48,163	48,006	44,521
Source: U. S. Bureau of Mines. *Not available. ^b Retail dealer deliveries.							

	Latest Week*	Month Ago	Year Ago
<i>Business Week Index of Business Activity, week end-</i>			
Jan. 17.....	191.0	192.7	190.3
Steel ingot operations (% of capacity).....	96.1	86.6	92.5
Electric power output (million kw.-hr.).....	5,370	5,368	4,857
Crude oil prod. (daily avg., 1,000 bbl.).....	5,326	5,284	4,624
Mise. & L.C.L. carloadings (daily avg., 1,000 cars).....	81	86	79
All other carloadings (daily avg., 1,000 cars).....	57	56	59
Prices, spot commodity index (Moody's, Dec. 31, 1931 = 100).....	452.0	457.7	373.0
Prices, industrial raw materials (B.L.S., Aug., 1939 = 100).....	285.3	295.2	262.3
Prices, domestic farm products (B.L.S., Aug., 1939 = 100).....	422.4	415.3	304.2
Prices, finished steel composite (<i>Steel</i> , ton).....	\$78.18	\$76.09	\$69.68
90 stocks, price index (Standard & Poor's Corp.).....	117.2	120.7	119.3
*Date of latest week for each series on request.			

IN THE GRAVEL PITS —
ON THE HIGHWAY —

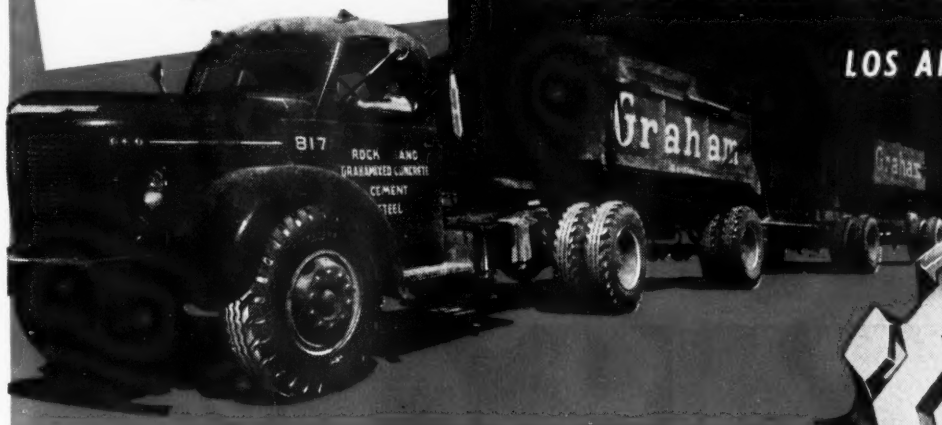


Tire cost is a major item in our type of operation. For that reason we must hold tire expense to the minimum. We do that by using Firestone All Traction Tires. They are money savers.

PAUL GRAHAM, President
Graham Brothers

IT'S Firestone FOR Graham Brothers of

LOS ANGELES, CALIFORNIA

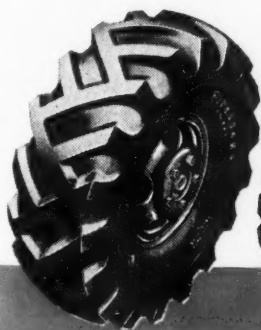


FIRESTONE builds tires for every load, road and condition of service — tires fitted to the job.

For Graham Brothers in the rock and concrete business in Los Angeles, the tire that fills the bill is the Firestone All Traction. It has the traction for off-the-highway use and the roadability and long life for over-the-highway hauling. And it slashes costs.

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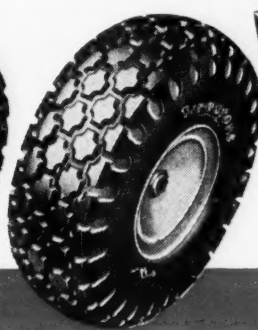
Whatever your hauling job may be you can cut tire costs by equipping your trucks with Firestone Tires fitted for your specific job. Give them a trial. They will prove it.



GROUND GRIP



ROCK GRIP



EARTH MOVER

Firestone

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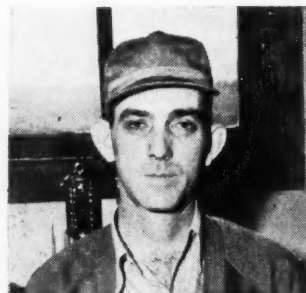
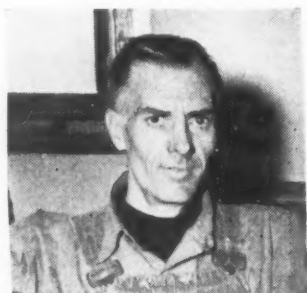


H. L. Meadows (left), safety inspector; L. V. Smith, section foreman; J. E. Broom, weighman; C. L. Elmore, stock-yard foreman; Pearson Sumner, outside plant superintendent, and Carl Oliver, shop foreman, day shift, Praco mine, Alabama By-Products Corp., Praco, Ala.

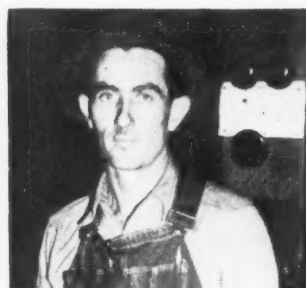
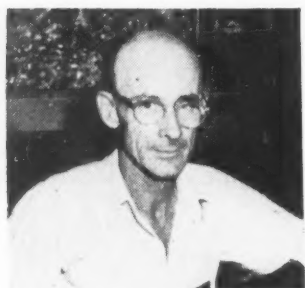


R. T. Hill (left), superintendent, Praco mine, and H. J. Hager, assistant general superintendent, Alabama By-Products Corp., Praco, Ala.

COAL MEN



Left to right—Joseph Anthony, night top foreman; Pete J. Gallo, night face boss; Richard Taylor and Russell Mitchell, face bosses, St. Ellen mine, Perry Coal Co., O'Fallon, Ill.



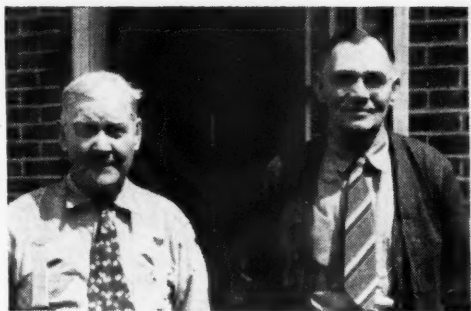
Left to right—H. D. Bolinger, superintendent, Sun Coal Co., Caryville, Tenn.; Ernest Miller, tippie foreman, Southern Collieries Co., Lake City, Tenn.; Harold C. Brown, chemist, and Clarence Ischner, mechanic, Bevier Coal Co., Macon, Mo.



H. D. Hickman (left), pit foreman, Sipsey Strip Pit No. 1, and L. R. Jackson, stripping superintendent, DeBardeleben Coal Corp., Sipsey, Ala.



J. T. Craddock (left), general mine foreman; George Thornley, assistant, and L. P. Robertson, safety inspector, Helen (W. Va.) No. 9, Eastern Gas & Fuel Assoc. (photo, E. G. & F. "Associate").

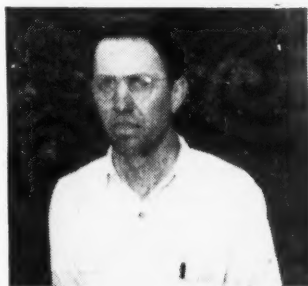


James M. Jones (left) and John Stephenson, mine foremen, Sewickley and Pittsburgh seams, Warwick mine, Duquesne Light Co., Greensboro, Pa.

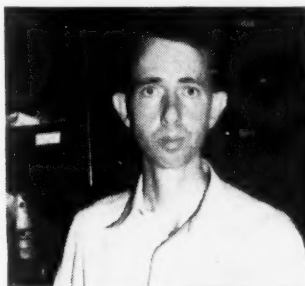
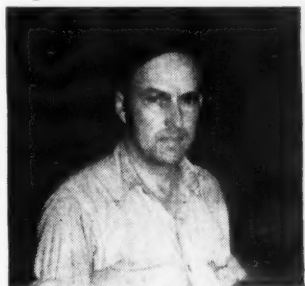


Lester Hogue (left), section foreman; Louie Pete Cicero, section foreman; W. T. Dale, section foreman; Milton Love, section foreman; W. A. Newman, section foreman; Jack Adcock, motor boss; and W. J. Thomas, section foreman, night shift, Praco mine, Alabama By-Products Corp., Praco, Ala.

ON THE JOB



Left to right—G. C. King, pit foreman, Mayview stripping, and J. H. McMahon, secretary, Rothery Bros., Inc., Elizabeth, Pa.; Carl Mounts, safety director, and Michael Sidick, chief electrician, Castle Shannon Coal Co., Coverdale, Pa.

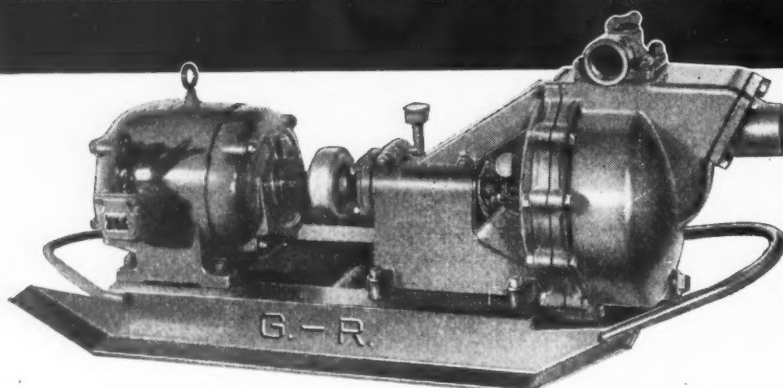


Left to right—Paul E. Jones, superintendent; V. H. Vines, supply clerk; W. W. Fikes, master mechanic; and J. W. Parker, foreman, mine-car shop, Flat Top mine, Sloss-Sheffield Steel & Iron Co., Flat Top, Ala.

Officials of The Hanna Coal Co. include, left to right: Front Row—A. A. Mills, purchasing agent; Walter Bernoski, inside superintendent, Piney Fork; J. S. "Casey" Harmon, general superintendent of strip mines; Norman Prudent, general manager, underground mines; Clyde Gibson, production. Next Row—William Roy, Jr., legal; Russell Wilmoth, superintendent, Piney Fork; James Hyslop, executive vice president; Frank Kettring, secretary; James Reilly, vice president, operations; Frank Zachar, superintendent, Willow Grove; Don Saxton, superintendent, Georgetown. Next Row—Andrew Hyslop, chief engineer, central machine shop; Charles Hagenbuch, engineering assistant to vice president; Arch Lafferty, auditor; Francis Sturms, stores; O. P. Clay, personnel; George Pyle, strip mines. Back Row—Ray Zimmerman, preparation engineer; Gene Jenks, strip mines; John Mullen, outside superintendent, Dun Glen; James Ault, statistical engineer; E. V. Johnson, business office; Otis Bledsoe, assistant to the general superintendent of strip mines.



LOW HEADROOM? *Simply Specify* GORMAN-RUPP PUMPS



A LOT OF PUMP IN A SMALL SPACE

These husky, self-priming, centrifugal mine gathering pumps will handle large quantities of water yet take unbelievably small headroom - from 13½" to 21¼", depending upon size. (pump only)

Ideal for remote locations and automatic operation - requiring little or no attention, operating 24 hours a day, continuously, day after day without shut-down.

Positive and powerful self-priming. No adjustments required between prime and run - start the motor and you start the water.

Sand, muck or solids that will pass the intake strainer **WILL NOT CLOG** or harm a Gorman-Rupp.

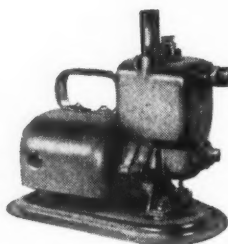
Absolute Simplicity - only one moving part, the impeller - no reduction gears or valves. All wearing parts can be quickly replaced by an inexperienced man with common tools.

You can't beat a Gorman-Rupp for dependability and performance. Available in capacities from 50 to 200 GPM and heads up to 125 feet. Write today for special mine bulletin showing some interesting actual installations, or contact your nearest distributor.

CONTROL COAL DUST

This tiny, all bronze MINE SPRAY PUMP weighs only 27 lbs. Exceedingly valuable for coal dust control and any number of other uses around the mine.

Fitted for using with ¾" pipe or common garden hose - lifts up to 25 feet - delivers 8 GPM at 40 lbs. pressure. Maximum capacity 16 GPM - Maximum pressure 50 lbs. Electric motor driven, completely self-priming, ready for instant use. Write for Bulletin 7 ME-11.



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CHARLES H. LAMBUR has resigned as general manager of operations for Simpson Creek Collieries Co. to become president and general manager of the United States Collieries, Inc., with offices at 150 Broadway, New York. He also will do consulting work in engineering, development, operation and management of strip and deep coal mines. During the time he was in charge of Simpson Creek operations, production was increased from 1,300 to 8,000 tons daily, with an output of 14 tons per man, total payroll. He was previously assistant editor, *Coal Age*, and also was associated with the Sahara Coal Co. During the war, he served with the Army Engineers, in Africa and Europe, attaining the rank of colonel.

Bridgeport, Maxwell, Gates and Palmer mines of the H. C. Frick Coke Co. George W. Ache Jr. has been appointed superintendent of the Shoaf and Collier mines and C. W. Conner Jr. superintendent of all Leisenring mines.

J. E. Elkin, formerly superintendent, Warwick mine, Duquesne Light Co., Greensboro, Pa., has been appointed assistant general superintendent of the company, succeeding J. A. Younkins.

W. A. Gallagher, Vincennes, Ind., has been appointed assistant to E. P. Humphrey, vice president, Westmoreland Coal Co. and Stonega Coke & Coal Co., with offices in Philadelphia. During the past several years Mr. Gallagher has been a supervising engineer for the U. S. Bureau of Mines in the States of Illinois, Indiana, Missouri, Iowa, Eastern Nebraska and Western Kentucky, and was previously associated with coal companies in Pennsylvania and West Virginia.

Roy A. Ison, formerly assistant general superintendent, Red Jacket Coal Corp., Red Jacket, W. Va., has been named assistant general manager of the company. Mr. Ison has held engineering and supervisory po-

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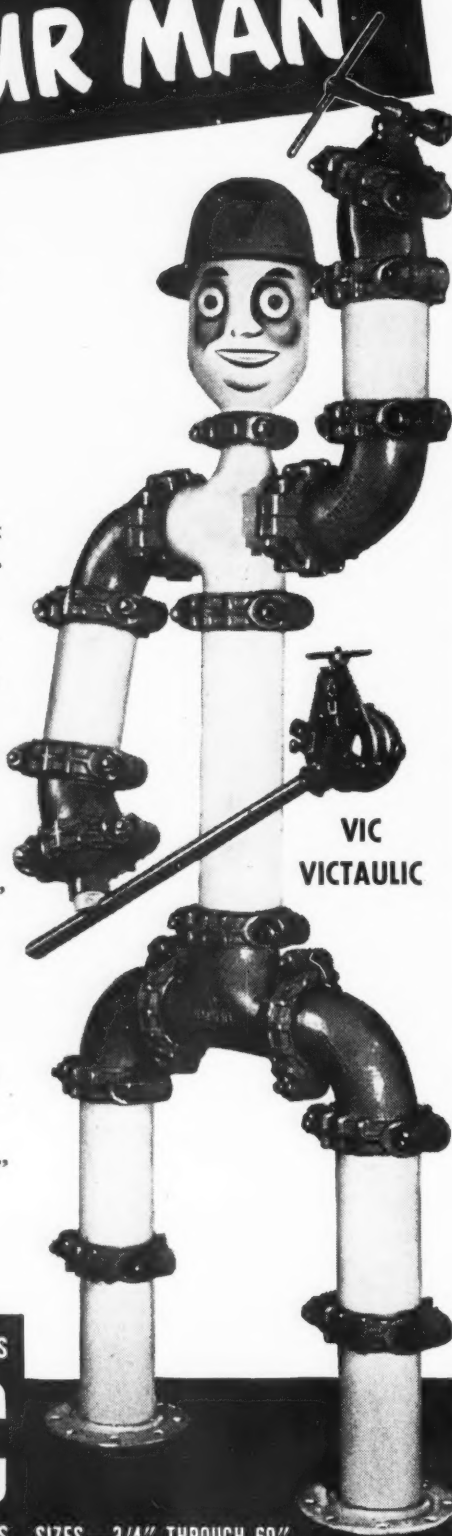
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sitions with several coal companies in Kentucky and West Virginia and has been associated with Red Jacket since 1942, except for a year when he maintained an engineering office in Pikeville, Ky.

Kenneth K. Kincell, assistant superintendent, Mine No. 63, Consolidation Coal Co. (W. Va.), Monongah, W. Va., has been named superintendent, succeeding George W. McCaa. Mr. Kincell, who started with Consol in 1933 as an inside laborer, has held supervisory positions at several of the company's mines, becoming assistant superintendent at Mine No. 63 last May.

Other promotions announced by Consol include the appointment of M. H. Ireland and Lloyd L. VanPelt as section foremen at Mine No. 63. At Mine No. 93, Jordan, Albert Powell, formerly section foreman, has been made assistant mine foreman. John J. Konkoly and C. V. Rowand have been appointed section foremen and A. B. Conrad made dispatcher. W. L. Reynolds has been named tippie foreman. At Mine No. 98, Nora, O. F. Allen, formerly assistant mine foreman, has been named mine foreman and has been succeeded by Edgar L. Zuspan, formerly section foreman. W. E. Heldreth has been made section foreman.

C. E. Linkous, for the past six years senior mine inspector in southern West Virginia for the U. S. Bureau of Mines, has been named assistant director of safety for the Island Creek, Pond Creek Pocahontas and Marianna Smokeless Coal Companies, Holden W. Va. Mr. Linkous was a Kentucky state mine inspector for four years and previously held supervisory positions with the Inland Steel Co., Wheelwright, Ky.

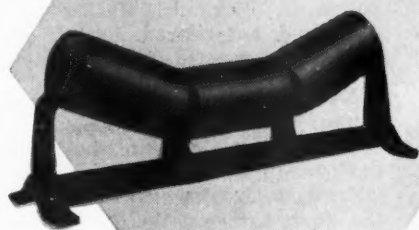
Neely C. L'Argent, who has been active in prospecting for the company, has been appointed strip mine superintendent for the Consolidation Coal Co. (Ky.), Jenkins, Ky. At the company's Mine No. 204, D. A. Zegeer, transitman, has been promoted to mine engineer. Victor Mullins, assistant maintenance foreman at Mine No. 204, has been appointed maintenance foreman and is succeeded by Edgar Wright. Wilson Harrison, assistant mine foreman, Mine No. 214, has been named mine foreman at the company's Hill mine, and Lester Flint, repairman at Mine No. 207, has been made maintenance foreman at Hill. C. C. Dorton, formerly section foreman, has been appointed assistant mine foreman, Mine No. 214. Clyde White, previously mining engineer at Clover Splint mine, has been promoted to chief engineer and general outside foreman. Charles R. May has been appointed section foreman at Mine No. 155.

The Hudson Coal Co., Scranton, Pa., has announced several promotions among supervisory personnel: Fred

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Belt Carriers**



Available in roller, ball or plain bearings
"Four-pass" grease seal protects bearings

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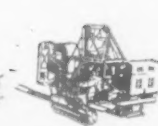
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Wood's new ZEPHYR Weight Coal Shovel is a revolutionary contribution to more efficient, less hazardous coal mining. Its lightweight aluminum alloy blade eliminates 2 to 3 pounds "dead weight" from every stroke. This blade, too, is non-sparking—an invaluable safety factor. Unaffected by sulphur water or other corrosive agents, the Wood's ZEPHYR Weight Coal Shovel gives much longer service . . . affords true final-cost economy . . . See your Wood Jobber now!

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A NEW SHOVEL DEVELOPMENT BY



Specialists in Shovels, Spades, Scoops

MEETINGS

- A.I.M.E.: annual meeting, Feb. 15-19, Pennsylvania Hotel, New York.
- Chicago Stoker Exposition, under the auspices of Chicago Merchants Association and Midwest Stoker Association: Mar. 11-17, Commonwealth Edison Assembly Hall, Chicago.
- Canadian Institute of Mining and Metallurgy: Golden Jubilee and annual meeting, week of Apr. 6, Vancouver, B. C., Can.
- Tenth Annual Midwest Power Conference, sponsored by Illinois Institute of Technology: Apr. 7-9, Sheraton Hotel, Chicago.
- American Mining Congress: annual coal convention April 26-28, Netherland Plaza Hotel, Cincinnati, Ohio.

J. Longauer, formerly breaker foreman, has been made assistant outside foreman, Olyphant colliery, Olyphant, Pa., and is succeeded by William Hare, formerly jig boss. John A. Williams has been appointed section foreman at Olyphant. John P. Ketchel has been promoted from fireboss to section foreman at the Delaware colliery, Hudson, Pa., and William G. Jenkins has been made fireboss at that colliery. Joseph B. Nichols, section foreman at the Delaware colliery, has been transferred to the Pine Ridge colliery, Wilkes-Barre. Anthony W. Walsh has been made section foreman at Pine Ridge.

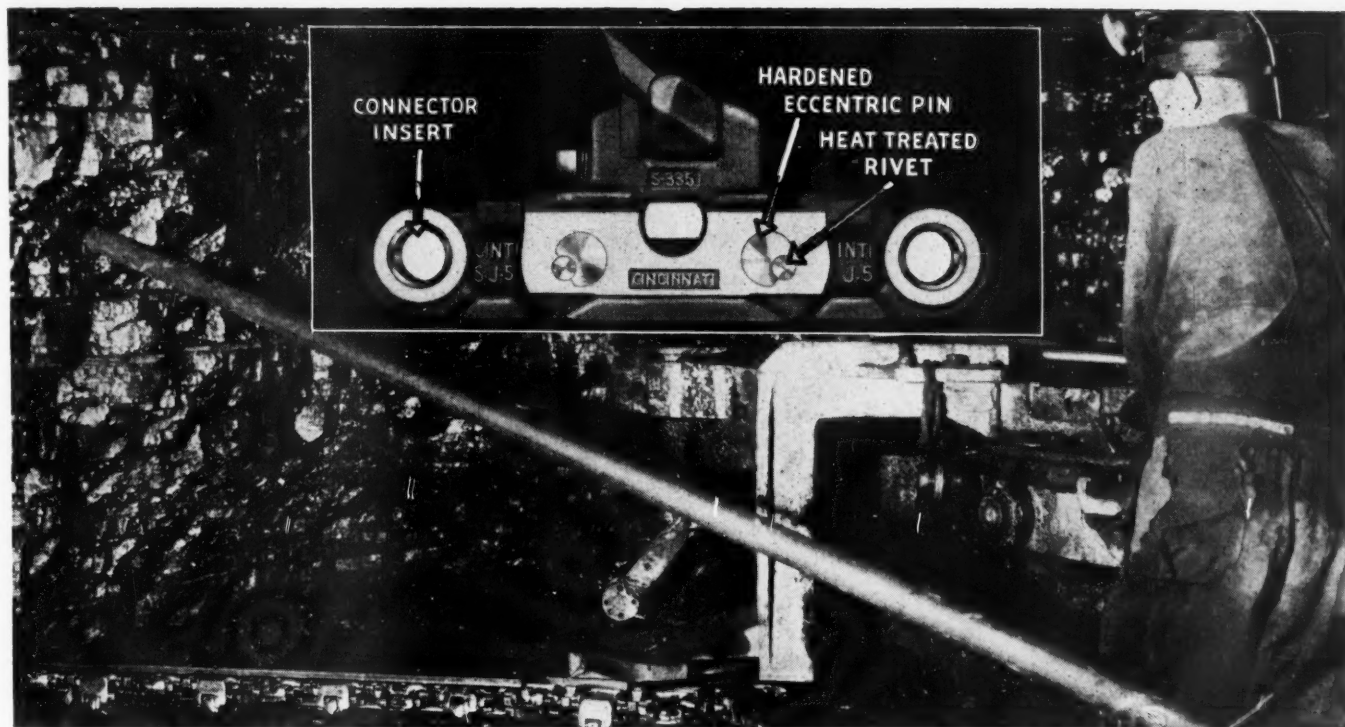
H. E. Sanford, federal mine inspector, Beckley, W. Va., is being transferred to Germany for a study of safety and mining conditions in the Allied occupied zone.

W. K. Bromley, manager, coal department, Pickands, Mather & Co., Cleveland, has retired. John R. Chandler has succeeded Mr. Bromley.

Monroe J. Mechling, with the U. S. Bureau of Mines, Greensburg, Pa., has been named to head the Bureau's new sub-district office at St. Clairsville, Ohio, from which inspections in the four northern counties of West Virginia and all of Ohio will be directed.

Sheldon P. Wimpfen, for the last two years assistant editor, *Mining & Metallurgical Engineering*, has been named editor, *Mining Congress Journal*. Previous to his war service in the Marine Corps, Mr. Wimpfen was associated with various mining companies in the western states, the Philippines and Bolivia.

Harold R. Mays has been appointed district representative for Coal Heating Service Division, N. C. A., in Salt Lake City, Utah. Mr. Mays has been active in the retail coal trade for the past 22 years, the last 12 of which he operated his own business in Salt Lake City.



A Cincinnati No. 665 Duplex Chain used on Jeffrey 29-B Machine cutting in hard Indiana No. 6 Seam in one of Indiana's larger mines.

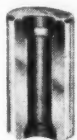
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Miners Greet Christmas Eve With Carols

Carols rang out in the frosty air Christmas Eve morning as more than 100 miners gathered before daybreak to sing "Silent Night" and "Joy to the World" at the portal to the Newkirk colliery, Philadelphia & Reading Coal & Iron Co., Tamaqua, Pa. Electric cap lamps pierced the dark and were reflected by snow that lay on the hillside as the mercury stood at 18 deg. The singers, dressed in their work clothes for the caroling, turned to their jobs an hour earlier than usual to earn an early quit for Christmas Eve. Mine officials said "a fine day's production" followed the singing.

The program was arranged under the direction of R. S. Davies, superintendent of the Newkirk colliery, who for some months past has trained the group of singing miners as a spare-time hobby. At the Christmas Eve ceremonies, accompaniment was provided by Dick Donald Jr., Eugene Wilking and Stanley Matas, trumpeters, and Capt. Hazard, Salvation Army, trombonist. Top-management officials attending the caroling included George A. Roos, vice president; Edward G. Fox, general manager; D. E. Ingersoll, superintendent, Pottsville division; and Edward A. Lynch, director of personnel.

New Developments

- Immediate development of a new coal mine at Lynch, Ky., designed for a daily production of 5,000 tons and planned primarily to furnish metallurgical coal to the Chicago-district operations of the U. S. Steel Corp., was announced last month by Harry M. Moses, president, U. S. Coal & Coke Co., a subsidiary of U. S. Steel. Construction work is to be begun at once, with coal production expected early in 1949. The new mine, which will be completely mechanized, will insure continued mining activities in the Lynch area. Two mines now are being operated there, and according to Mr. Moses, it is expected that the new operation will replace their normal depletion over the next several years.

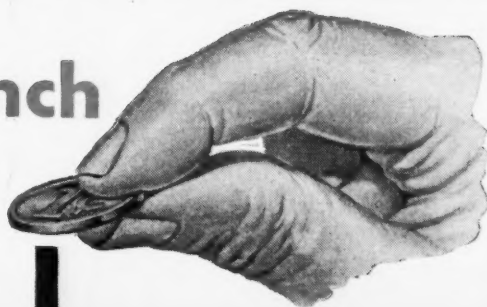
- Progress in the development of six new mines it is opening (*Coal Age*, May, 1947, p. 126) was recently reported by the Island Creek Coal Co., Huntington, W. Va., in a statement to stockholders. Mine No. 24 is now producing approximately 3,000 tons daily and is expected to reach its full capacity of 4,000 tons daily around March 1. Mines Nos. 25 and 26 also are in production and their

output is expected to increase rapidly over the next few months, reaching their planned capacities of 4,000 and 2,000 tons daily, respectively, about Jan. 1, 1949. The separate preparation plant for Mine No. 25 now under construction should be completed about Aug. 1.

Mine No. 30, now in operation and producing 600 tons daily, is to be brought up to full capacity of 1,800 tons per day by the end of the year, the company states. Construction and development work on Mine No. 28 has been begun and substantial production should be achieved by the middle of the year if machinery contracted for is delivered on schedule. A sister mine, No. 29, is projected for early development. Mines Nos. 24, 25 and 26, with a total capacity of 10,000 tons daily, is expected to more than offset reduction in tonnages from some of the company's older mines during 1948 and there is every indication that demand for the type of coal produced and sold will exceed its supply, the company says. Total production in 1947 of Island Creek and subsidiary companies, including lessees, was 8,283,000 tons, as compared with 6,839,694 tons in 1946.

It also was understood from other sources that plans and surveys for the company's new Mine No. 27, un-

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The right oil here saves far more than it costs!

You're looking at a danger spot in industry—the spot where two gear teeth come together. That white line shows the contact area where pressures build up, sometimes to thousands of pounds per square inch.

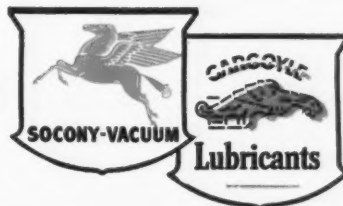
This is no place to pinch pennies on lubrication. The right oil or grease here resists high pressures, protects gears against metal-to-metal contact and failure. The cost is negli-

gible, compared to the many benefits obtained.

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compact . . . no waste space, compressor and engine coupled into a single, rigid, permanently aligned unit . . . balanced to reduce wear and increase efficiency!

lightweight . . . Portables designed for quick handling to and from the job, stationary units vibrationless.

easy to start . . . Just push the built-in electric starter, and the Compressor starts . . . to give you a continuous amount of air.

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Other features, however, enter into the usefulness of Schramm. There's 100% water cooled feature, allowing you to operate Schramm perfectly both summer and winter; mechanical intake valve, forced feed lubrication, to mention a few.

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EQUIPMENT APPROVALS

Three approvals of permissible equipment were issued by the U. S. Bureau of Mines in December, as follows:

Joy Mfg. Co.—Type 55C-4PD storage-battery shuttle car; three motors, each 7½ hp., 96 volts, d.c.; Approval No. 2-600; Dec. 10.

Joy Mfg. Co.—Type 32D11P storage-battery shuttle car; three motors, each 5 hp., 96 volts, d.c.; Approval No. 2-601; Dec. 19.

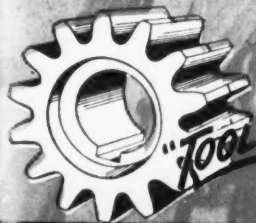
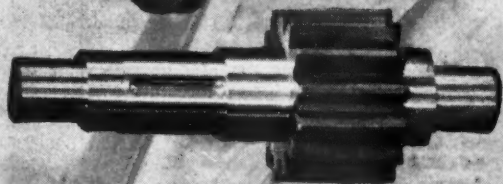
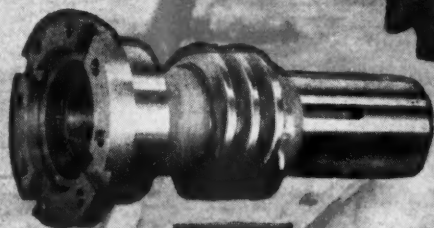
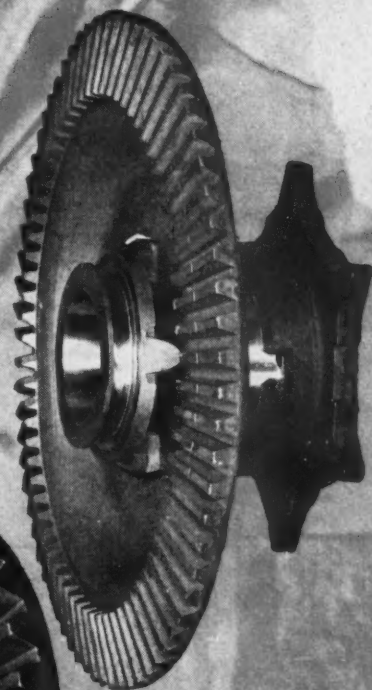
Joy Mfg. Co.—Type 88U-13N loader; 15-hp. motor, 500 volts, d.c.; Approval No. 2-602A; Dec. 22.

der way for about a year, were about complete. The new mine, which is located on the Right Fork of Trace Fork of Pigeon Creek, in Mingo County, is being planned for a 4,000-ton-daily production and the shipment of coal is scheduled for Jan. 1, 1950. The Lower Cedar Grove seam is to be mined and about 50,000,000 tons is estimated available for mining. The mine will be fully mechanized and plans call for a 135-ft. air-shaft, a 536-ft. slope and a modern steel tippie that will screen a variety of sizes for domestic and steam markets.

This operation will be served by the Chesapeake & Ohio Ry., which announced early in the month that it would start construction as soon as possible on the 5.93-mile extension of its Trace Fork subdivision to run from a point near Holden, W. Va., to the mine, which was approved by the ICC Dec. 31. The new line, which is to cost an estimated \$2,500,000, will require a tunnel through Trace Mt. The Island Creek Coal Co. intervened with the ICC when the C. & O.'s application was opposed by the Norfolk & Western Ry.

- The West Virginia Coal & Transportation Co., West Columbia, W. Va., has reportedly signed a 10-year contract with the American Gas & Electric Co. to supply fuel for its new \$40,000,000 steam-generated electric-power plant to be constructed at Graham Station, W. Va., and opened about the middle of 1949. The mining company is understood to have leased over 5,000 acres of coal holdings and to be planning the development of two new fully mechanized mines, each with a probable capacity of 600 tons daily, in the vicinity of its present operation. The American Gas & Electric also is reported to have available a large acreage of coal land for mining and to be negotiating with other mining companies for development of the properties. The power plant is planned to consist of two immediate units capable of supplying 3,000 kw. and requiring a supply of 3,000 tons of pulverized coal per day.

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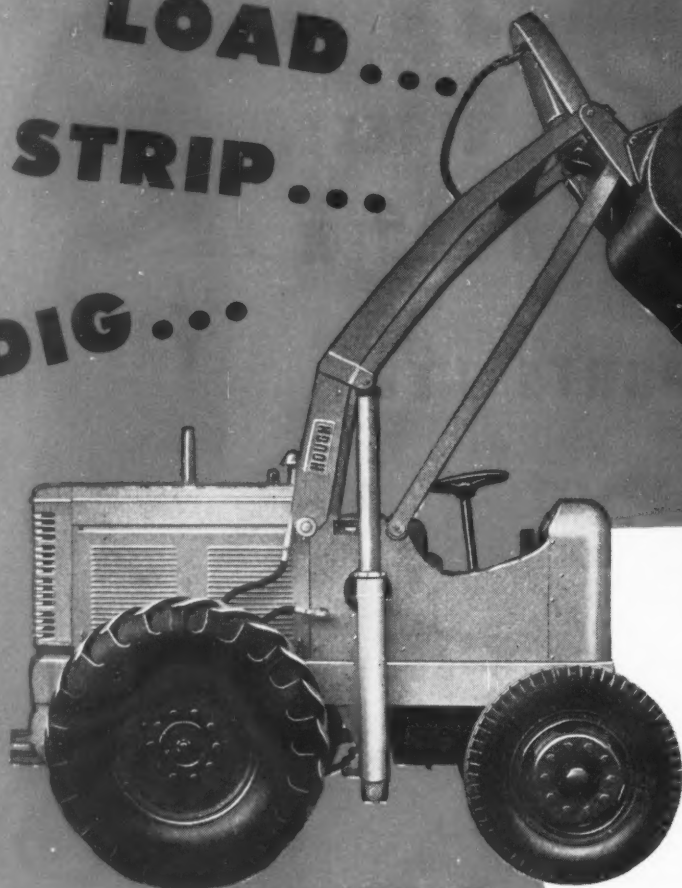
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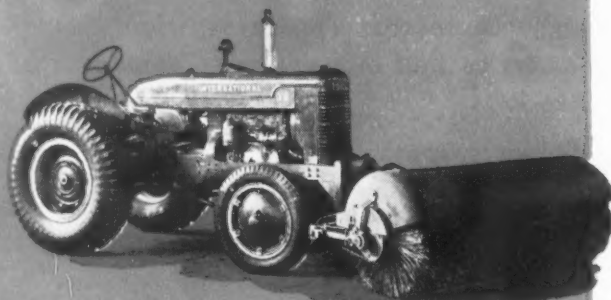
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Payloaders are complete Hough built pneumatic tire tractor shovels that are proving their usefulness at both strip and underground mines. At strip pit mines their superiority has been established for the job of removing the last few inches of overburden from the coal seam. They dig fast and carefully and do not chop or cut up the coal . . . dump their loads directly into trucks or carry them to disposal points. They also load coal, handle spoil, grade paths for draglines, build and maintain haulage roads, move drills, cable and junction boxes, remove snow, etc. Around underground mine properties these versatile shovels have made themselves indispensable for many loading, leveling, clean-up, hauling, pushing, snow-removal and other tasks.

Full information on the entire line of Hough Payloaders is yours for the asking. It will pay you to get complete facts, literature and the name of your Hough distributor.

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1949 — Can Be a Good Year Too

You can expect good business to run on well through 1948.

But old-time competition is close upon us.

And 1949 will be a critical year for all of us — making lower taxation imperative NOW.

These are the main conclusions drawn from a nation-wide survey of industry's plans for new plants and equipment which McGraw-Hill has just completed. Here are the major findings:

1. Capital expenditures in 1948 may be a little lower — but at the most only 8% lower — than in 1947.
2. In 1949 capital expenditures may decline. 1949 plans are still fluid. However, those which have been projected now show a falling off. (Washington planners, please note: Current official attempts to discourage capital expansion may turn out to be superfluous — or downright dangerous.)
3. Industry's initial postwar rebuilding will be 85% complete at the end of 1948. When this first wave of deferred maintenance and expansion is finished, American industry will have more than half again the capacity it had in 1939. This does not mean the end of needed capital expenditures. Business will need to invest much more. (President Truman sets an investment goal immediately ahead of \$50 billion.) But it does mean that tough competition is returning fast.

• IF YOU WANT full details of the McGraw-Hill survey of Capital Expenditures, which is summarized in this editorial, write to the Economics Department, McGraw-Hill Publishing Company, 330 West 42nd Street, New York 18, N. Y.

These are solid facts, based on plans which are firmly made by a broad cross-section of American industry and which the McGraw-Hill survey revealed.

The greatest contribution of this survey is the information it supplies on business plans for the purchase of new plants and equipment. What business planned to do about such expenditures was by far the biggest unknown element in the 1948 outlook. For, if business planned to slash its outlays for plants and equipment this year, that fact alone could bring a sharp downturn in business.

In making this survey, McGraw-Hill researchers all over the nation personally interviewed top executives of companies selected to make up a scientific cross-section of industry. Each executive was asked to give, *not his opinion* about general business trends, but *factual details* about his company's plans for 1948. By adding together the plans of the companies interviewed, McGraw-Hill has secured, for the first time, a reliable picture of what business plans to do in the months ahead.

Here are plans for 1948 and 1949, as revealed by the survey:

1. Industry still needs more than a year to finish its initial postwar maintenance and rehabilitation program.

Among manufacturing industries, top executives report that 64% of their program for the immediate postwar period is now complete. According to present plans, 85% will be installed by the end of this year even though some manufacturing industries still have a long way to go. For instance, oil companies will complete only three-quarters of their presently planned expansion program by the end of 1948.

2. Business may spend less on new plants and equipment this year than the record \$16.1 billion spent last year. But the decline

probably will be negligible and certainly will not be great enough to bring on a business recession.

At the time McGraw-Hill interviewed top executives, some companies had not yet approved their 1948 capital budgets. Under the extreme assumption that those particular companies will make *no* capital expenditures in 1948, industry's 1948 bill for new plants and equipment will run to \$14.9 billion, or 8% below last year's record figure. Under the more realistic assumption that those companies will cut their capital investment only as much as the companies which had already drawn up their plans for 1948, industry's 1948 capital budget will run to almost \$15.8 billion, a decline of only \$300 million from 1947.

Thus the over-all conclusion of the McGraw-Hill survey is that capital expenditures by business will be only slightly lower this year than last.

3. Business executives will not slash their 1948 capital budgets unless they are convinced that a real slump is in the offing—and they are not convinced now.

Almost two-thirds of all manufacturing companies say they would not cut capital budgets sharply even if business activity declined 20%. What is more, even a 15-20% boost in wage rates would have little effect on projected capital budgets. If wages go up, 57% of manufacturing companies would not change their capital budgets, 26% would increase them, and 17% would cut them.

4. Most executives look for an increase in their company's sales this year.

More than half of all manufacturing companies are planning on a sales increase over last year of 10% or more. A third of them say sales will be about the same as in 1947. And fewer than 10% look for lower sales.

5. Manufacturing companies will finance much of their purchases of new plants and equipment in 1948 from funds set aside out of past or current earnings.

Utilities and railroads, on the other hand, must go to the securities markets or commercial banks to finance most capital expenditures.

Although manufacturing companies say they can

finance this year's capital expenditures in large part from current profits and past savings, all evidence indicates that, to do so, they will use up most of the funds they earmarked during the war for this purpose. So in 1949, industry must go to the capital markets or to the commercial banks if it is to continue to spend for capital purposes. If the securities markets continue to lie in the doldrums, *as they will under present tax laws*, only companies with triple A credit ratings will be able to raise funds that way.

6. Purchases of new plants and equipment may fall off in 1949.

The McGraw-Hill survey collected all available evidence on plans for 1949 capital budgets. Fewer than 40% of all manufacturing companies now have definite plans for 1949. Of those that have plans, 45% intend to spend less than in 1948, 30% plan to spend the same amount, and a quarter expect to spend more. These preliminary decisions would seem to indicate that capital investment may fall off in 1949.

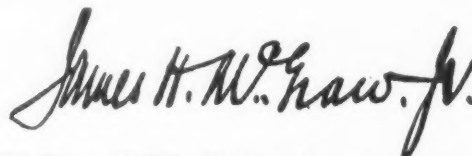
7. Industry's production capacity in 1949 will be far above prewar.

Manufacturing capacity will be more than 50% greater than in 1939 once the present wave of postwar building is complete. Almost a third of all manufacturing companies report that their capacity will be double or more than double the prewar figure. Thus, 1949 may see a huge increase in production of many things that now are hard to buy.

The last two points in this summary mean that 1949 will be a critical year. We must forestall a sudden drying up of capital expenditures in that year. We must be able also to absorb a great outpouring of production both of capital and consumer goods.

What will happen to business in 1949, therefore, will depend on how successful we are this year in dealing with such momentous problems as taxation, foreign aid and prices. But 1949 *can* be a good year too.

The next editorial in this series will discuss the pivotal problem of taxes.



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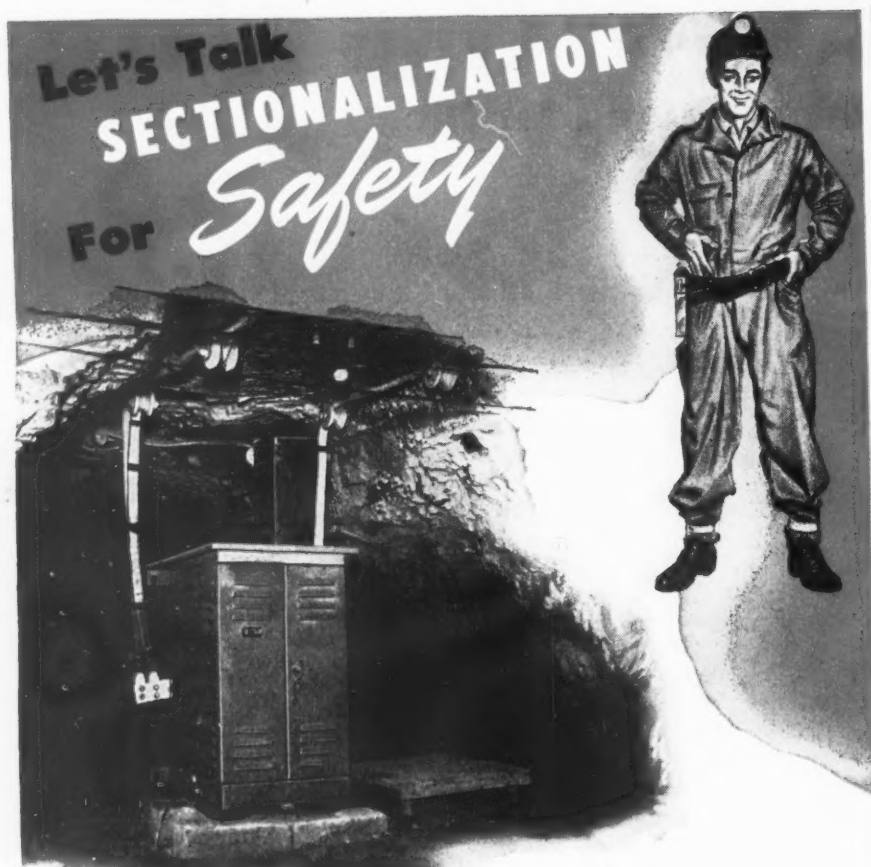
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SECTIONALIZING Switchgear

- Coal mining operations formerly conducted by the Carter Coal Co., recently purchased by a group made up of three steel companies (*Coal Age*, January, p. 98), were to be carried on, effective Jan. 1, by the recently formed Olga Coal Co., with its main office in the Union Commerce Bldg., Cleveland. Incorporation papers noted that the former Olga Coal Corp. was being dissolved and that the new firm would have full rights to the trade name, "Olga Coals." Pickands Mather & Co., Cleveland, will act as exclusive sales agent for Olga Coal Co. in sales and distribution of the "Olga" and "Caretta" coal available. The former sales office and personnel of the Carter Coal Co. have been taken over by Pickands Mather and the former Carter sales offices will serve each locality as in the past.

Considerable speculation in recent weeks as to the amount of the former Carter tonnage its retail customers would receive under the new set-up was ended last month by the report attributed to a Pickands Mather official that the coal would be screened for the retail trade as formerly, with the prepared coal going to former customers in substantial amounts that would total better than 80 percent of the former tonnage. Total production of the three Carter mines, Olga Nos. 1 and 2 and Caretta, has approximated 3,000,000 tons yearly in recent years.

- Big Sandy Elkhorn Collieries Co., Inc., Pikeville, Ky., has been purchased by the Standard Ore & Alloys Corp., New York, operators of the Simpson Creek Collieries Co. and the Sparta Coal Co. The mine, located on the C. & O., will be completely mechanized and present production of 300 tons daily increased to 1,500 tons daily by the middle of 1948. H. G. Turner, formerly division superintendent, Davis Coal & Coke Co., Thomas, W. Va., has been named general superintendent of the operation.

- The Republic Steel Corp. has purchased the Fire Creek Fuel Co. and the Standard Fire Creek Coal Co., both of Beckley, W. Va., reportedly to increase its supply of low-volatile coal for steel making. The companies employ 200 miners and about 2,500 acres of Pocahontas Nos. 4 and 6 coal land were included in the purchase. No change in operating personnel is expected.

- Youngstown Mines Corp., subsidiary of Youngstown Sheet & Tube Co., is reportedly planning to mechanize its Dehue mine at Dehue, Logan County, W. Va. Capacity of the operation now is 2,200 tons daily. The company also is understood to be planning a new coal-cleaning plant to prepare coal from this mine.

- The former No. 6 mine of the Christopher Mining Co., Four States, W. Va., recently purchased by the Rochester & Pittsburgh Coal Co. (*Coal Age*, January, p. 98), has been



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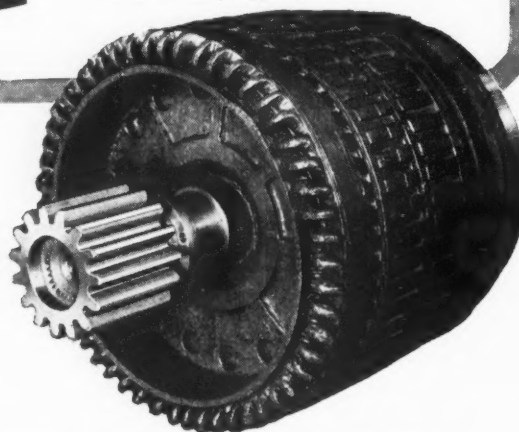
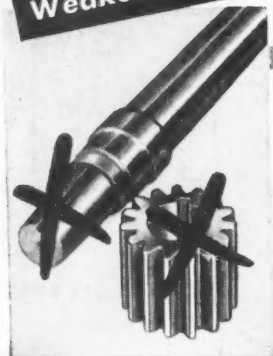


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renamed the O'Donnell mine. Rochester & Pittsburgh also has changed the name of its Big Ben mine, at Twin Rocks, Cambria County, Pa., to the Renglo mine.

- Sterling Coal Co., Elmora, Cambria County, Pa., has announced plans for improvements in its mines that will cost an estimated \$300,000. Included in the program are installation of mechanical machinery in the No. 1 mine, installation of eight conveyors, 4,500 ft. of 16-in. pipeline and three miles of 70-lb. rail.

- Warner Collieries Co., Cedar Grove, W. Va., is reportedly planning to open a new mine at Mammoth, W. Va., on Kelley's Creek, with improved river loading facilities.

- A new coal-loading ramp being constructed by Consolidation Coal Co. (Ky.), Jenkins, Ky., near the tipple of the company's Mine No. 207, on the C. & O. at Dunham, Ky., was reported last month nearing completion. The ramp will have a capacity of 3,500 tons daily, to handle coal from truck mines in the area, many of which were leased from Consol.

- The Hanna Coal Co., St. Clairsville, Ohio, has begun construction of a fifth tipple for handling coal from its Georgetown No. 12 strip operation, near Cadiz, Ohio. The new steel structure will be the largest tipple at the mine, with a capacity of 5,000 tons per shift, and will be located on a Wheeling & Lake Erie switch. None of the other four tipples in operation at the mine exceed 3,500-ton capacity, company officials said.

- The Needmore mine, closed since 1936, is being reopened by Crichton Co., Phillippi, W. Va., and, according to Clarence Bailes, superintendent, production of 500 tons daily is anticipated in the near future.

- The Chesapeake & Ohio Ry. Jan. 20 asked the ICC for authority to extend its trackage in Mingo County, West Virginia, to serve new coal-mining developments. The new 6.94-mile line would run from West Gilbert, W. Va., to Horsepen Creek. The C. & O. said the U. S. Coal & Coke Co. had requested the service from it and the Norfolk & Western Ry. and that it was willing to discuss a plan for joint use of the facilities with the N. & W.

**Krug Committee Futile,
 Lewis Maintains**

An invitation from Secretary of the Interior Krug to sit on a coal industry advisory council was emphatically declined Jan. 22 by John L. Lewis, president, U.M.W.A.

In giving vent to another public airing of his feud with Mr. Krug, Mr. Lewis wrote as follows:

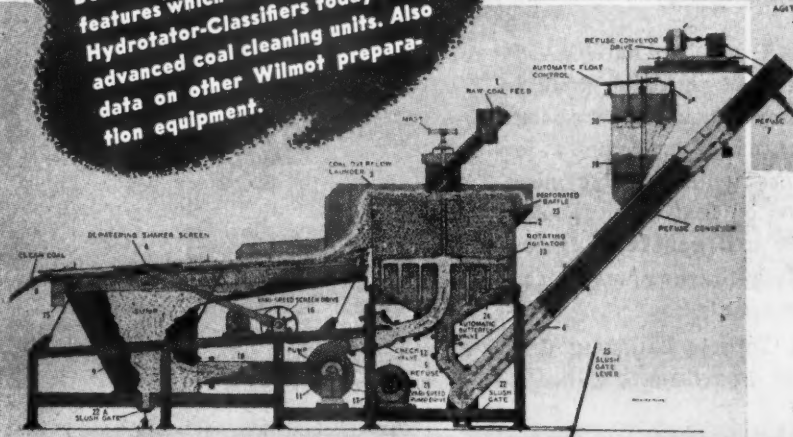
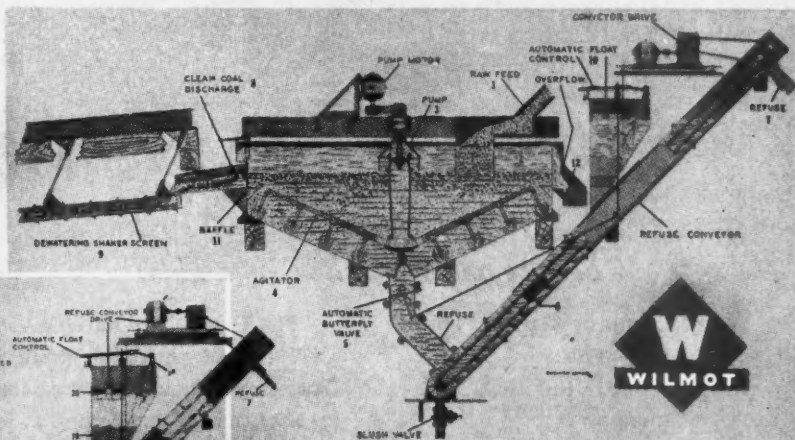
"I refer to your letter of January nineteen, reappointment of a coal Advisory Council. I suggest as follows:



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"1. It is questionable that you possess the authority to designate yourself or anyone else for the task of designing a pattern of production, distribution or regulation for the bituminous coal industry. It is the outstanding example of an American industry doing an adequate production job without cost to taxpayers and independent of bureaucratic advice.

"2. You have previously demonstrated your total lack of ability to comprehend the problems of the coal industry, as well as your complete lack of concern for its requirements. For two years you have done nothing to aid the industry in securing machinery for replacements or railroad cars to transport its product to market. Fifty million tons of production was lost during the calendar year 1947 through such inaction.

"3. I can conceive of nothing more anemic or futile than a Coal Industry Advisory Council attempting to give private advice to you. You have had such a committee to advise you on oil, and it is to be fervently hoped that the consumers of coal will be spared the present unhappy fate of the consumers of oil.

"4. The coal industry has no present problem affecting production that management and men in the industry cannot meet if provided adequate mining equipment and transportation. Congress has not bestowed upon you the power to establish controls for this industry. Recently you asked for such power, including the power to freeze wages, which was a gratuitous insult to the men employed in the mining industry. In the absence of the necessity for such a committee and Congressional authority empowering you to act, which I am sure Congress will withhold from you, the undersigned in the exercise of common-sense reasoning is forced to decline your invitation."

In writing Mr. Lewis, and other industry leaders invited to serve on the council, Mr. Krug wrote as follows:

"The bituminous coal industry of the United States is on the threshold of a new era in which the prospects for a high level of economic well-being are bright and in which even greater accomplishment can be made in coal research, safety, conservation, and other activities of importance to the industry. To attain these objectives, however, particularly in the coming years when the demand for American coals probably will be confined largely to our normal domestic market, will require foresight, planning, and action by the leaders of the coal industry.

"It is believed that there is much that can be done cooperately by the industry's own leaders to assure a stable future for its affairs. For that reason, and in order that I may have the benefit of the industry's point of view in current and future coal matters, I am anxious to establish a Coal

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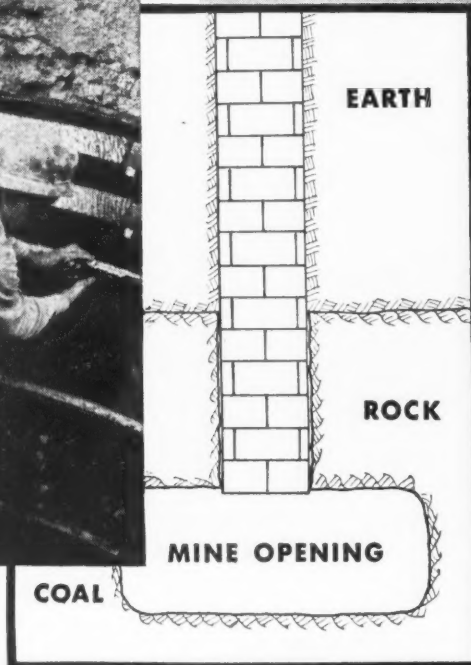
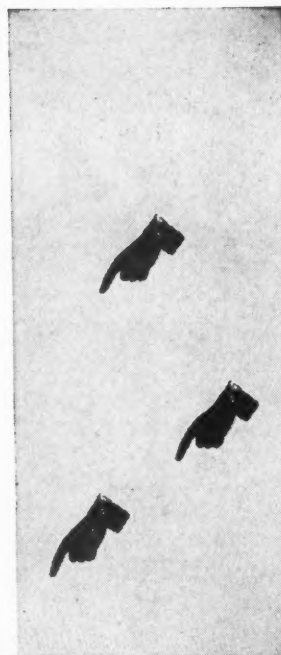


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Advisory Council composed of outstanding leaders in the coal industry who will serve as consultants and advisers to the Secretary of the Interior. Accordingly, I am pleased to invite you to become a member of the Council and to meet with me . . ."

Pennsylvania Strip Law Upheld in State Court

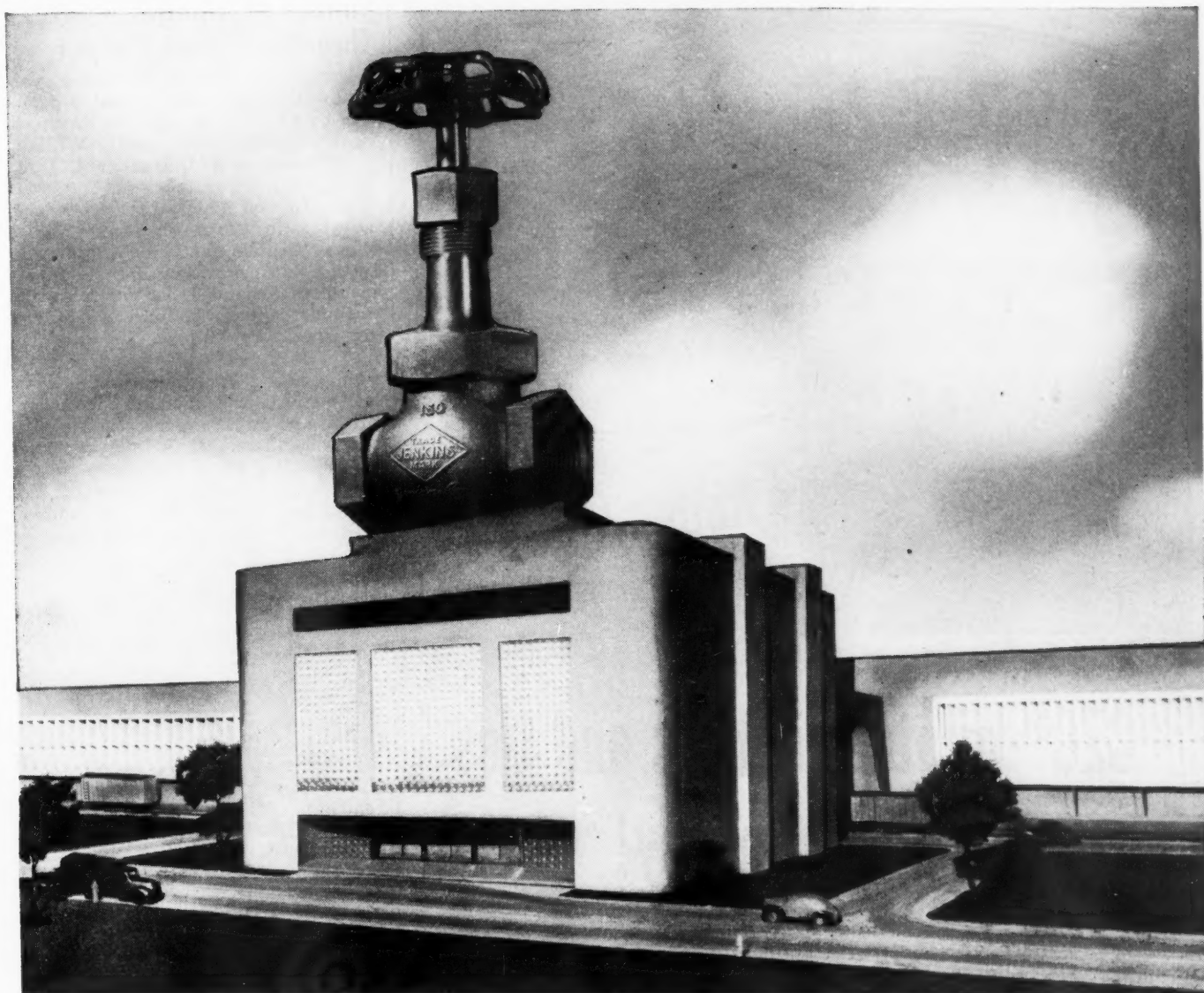
The constitutionality of Pennsylvania's 1945 law requiring bituminous strip-mine operators to post bond and restore the surface of the land after mining was upheld by the state Supreme Court Jan. 19. In the action, the court approved a Dauphin County court decision by Judge Karl E. Richards, which held the act legal on the grounds that it was a "proper exercise of the police powers of the commonwealth."

In appealing the ruling of the lower court, Alexander Dufour, one of 61 operators who have been fighting the law since its passage, maintained that the law conflicted with a provision of the state constitution providing that the general assembly shall pass no local or special law regulating labor, trade, mining or manufacture. His attorneys contended the state was empowered to provide for land conservation in the public interest but couldn't single out one industry engaged in recovering mineral resources by strip mining.

Steel Production At Peacetime High

United States steel production in 1947 topped all previous peacetime records, the American Iron & Steel Institute reported last month. The industry produced 84,787,501 net tons of ingot and steel for castings in 1947, as compared with 66,602,706 tons in 1946 and 66,981,662 tons in 1940, the previous peak for a non-war year. During 1947 the industry's furnaces operated at an average of 92.9 percent of capacity, the only peacetime year it has ever averaged above 90 percent of capacity. The loss of 6,000,000 tons from the theoretical capacity of 91,241,250 tons was attributed to the lack and poor quality of scrap, as well as the inferior quality of coking coals available.

In another statement the institute announced that the nation's steel industry had increased its capacity during 1947 by almost 3,000,000 tons, to a total capacity at the end of the year of 94,233,640 tons. Expansions and improvements scheduled for completion in 1948 and 1949 will add another 2,000,000 tons, it was reported. The U. S. Steel Corp. announced that during 1947 its capacity rose by 1,697,000 tons to a total of 31,226,200 tons, and that an additional 300,000 tons of steel-making capacity is now being installed.



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IF YOU THINK of *all valves* in this plant as *one valve*, you'll see the truth in this trick photo. Valves, collectively, represent one of the biggest investments in equipment in any plant.

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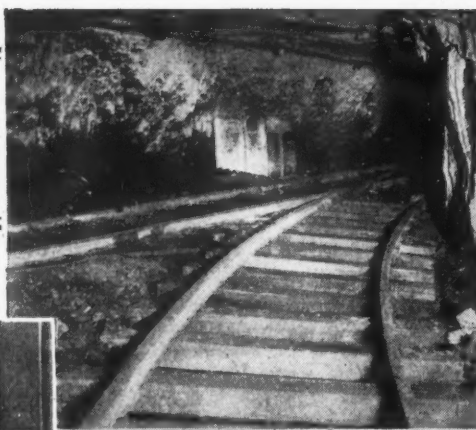
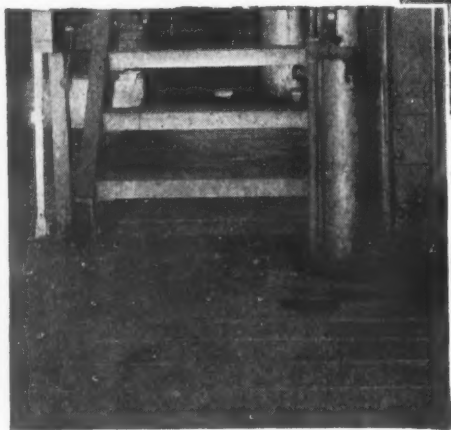
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Timber Stoppage Threatens Coal Output

Unless the supply of timber was resumed, a stoppage of coal production by 15,000 miners in southwestern Pennsylvania would result, William J. Hines, president, District 4, U.M.W.A., warned Jan. 17.

A strike of 11,000 timbermen and sawyers in parts of Pennsylvania, West Virginia and Maryland was settled Jan. 10 with granting of pay increases demanded, but union leaders announced that the men would not return to work until coal-mine customers of the members of the Tri-State Lumbermen's Association agreed to a 20-percent price increase for timber, props and millwork necessitated by the wage hike. Mr. Hines reported that shutting off of the timber supply was largely because "some of the larger coal companies have refused to pay sufficient prices to the lumber operators."

More Than 400 Employees Attend Beckley Banquet

Over 400 employees of the U. S. Coal & Coke Co. gathered in Beckley, W. Va., to attend the 34th annual banquet of the company's employee association and hear top company officials discuss various activities of the company. T. J. McParland, general superintendent of the Kentucky and West Virginia divisions, acted as toastmaster, and chief speaker of the evening was Harry M. Moses, president.

Other speakers, who outlined aspects of their departments' operations, included: R. S. Butler, assistant comptroller; William Foster, secretary and general counsel; G. M. Thursby, vice president in charge of industrial relations; A. J. Breitenstein, assistant to the president in charge of engineering; Joseph Menefee, superintendent of plant production; Lawrence Hoys, treasurer; G. W. Sweeny, vice president in charge of finance and comptroller; and Clifford Strote, purchasing agent.

Strip Ordinance Upheld in Kentucky

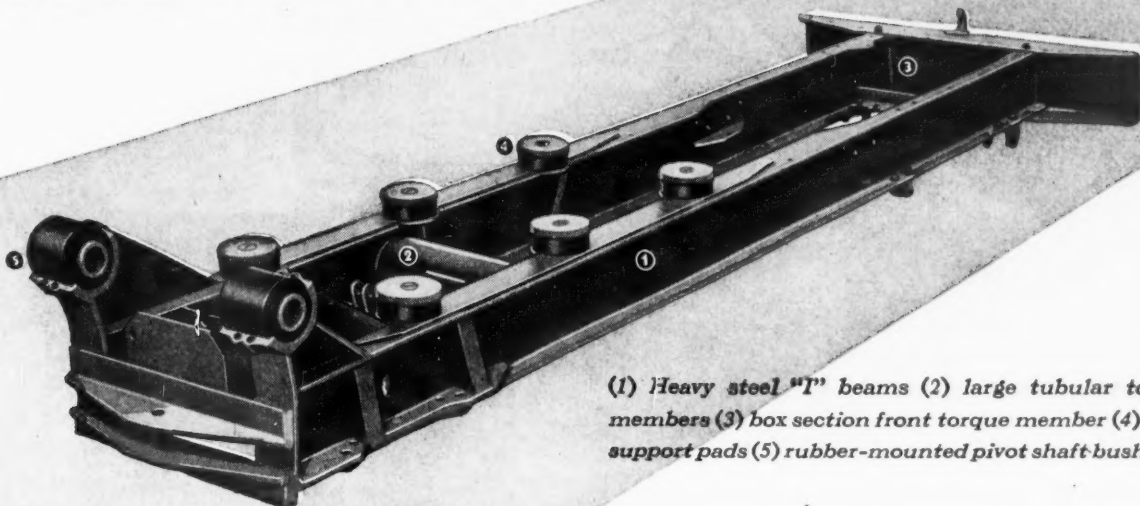
The legality of a municipal ordinance to regulate coal stripping operations within the city limits of Morton's Gap, Ky., was upheld last month in the Hopkins Circuit Court by Judge H. F. S. Bailey. Following the start of stripping last year, the city council passed an ordinance requiring operators to post a bond of \$500 an acre to guarantee replacing the land as nearly as possible to its original state and provided a fine of \$50 to \$100 a day for mining carried on without posting of the bond.

The court's ruling was released in an action brought by Glenn M. Gregory and others to prevent city officials

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Every part of the Rear-Dump Euclid is designed and built for heavy duty service and long life in off-the-highway work. This job proved performance is the reason why so many leading contractors and industrial users own and prefer Euclid hauling equipment. Your Euclid Distributor, Factory Branch or Representative will be glad to show you how Euclids can increase your production and cut your hauling costs.

● This massive, rigid frame is the backbone of the Rear-Dump Euclid — the off-the-highway truck that has proved its staying power on hundreds of the toughest mine, quarry and construction jobs.

Constructed of wide-flanged, deep-sectioned "I" beams stiffened by large tubular and box section torque members, the Euclid frame is built to last for the life of the truck. Rubber cushions provide for motion between the body and frame, cushioning the impacts of loading heavy excavation and hauling big loads over rough roads. There is no metal to metal contact between the body and frame.

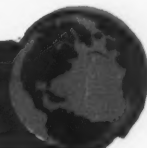
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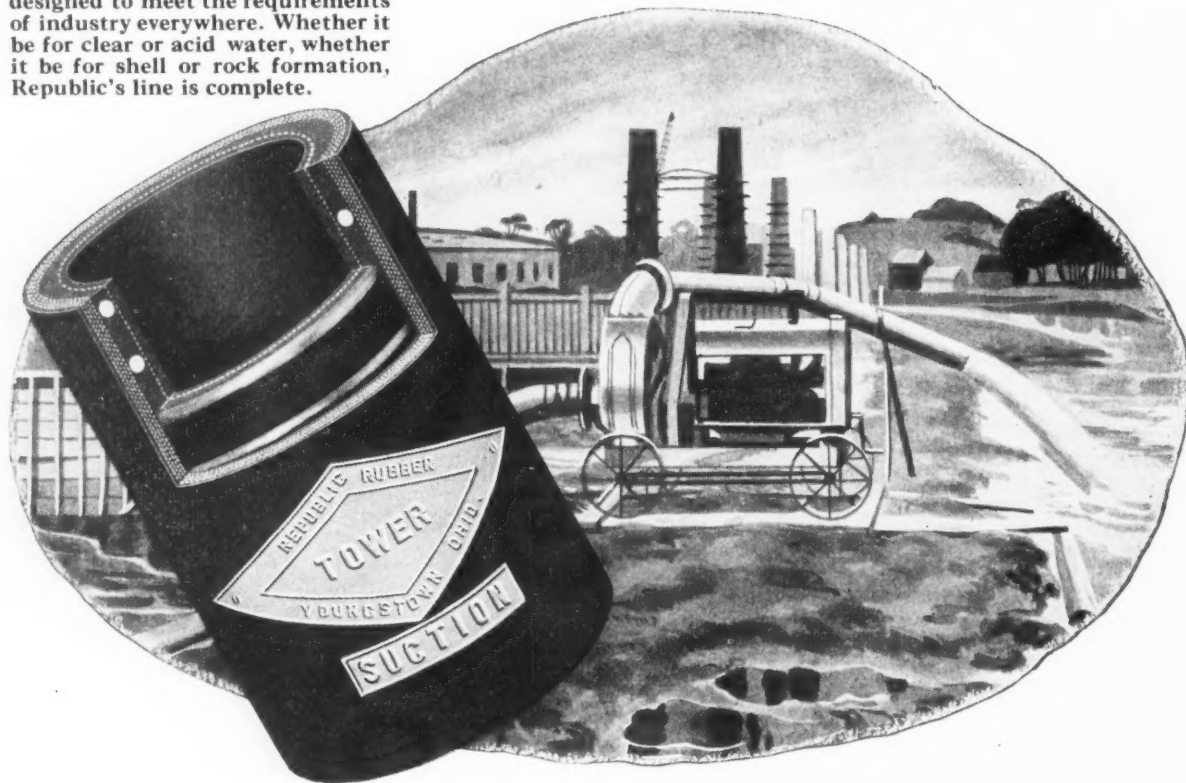


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from trying a shovel operator employed by Lester Babb, Madisonville, for violation of the ordinance in mining 10 acres of land leased by Mr. Babb. The plaintiffs maintained that Morton's Gap did not have authority to pass such an ordinance.

Law Violations Charged In Anthracite Blast

Four officials of the Franklin colliery of the Lehigh Valley Coal Co., Wilkes-Barre, Pa., were accused Jan. 19 of negligence or violation of mine laws in connection with the gas explosion at that colliery Dec. 11 in which eight men died (*Coal Age*, January, p. 126). The men were listed as defendants in a bench warrant issued by the Luzerne County Court on the basis of charges formally presented by Daniel H. Connelly, Andrew Wilson and John D. Edwards, state mine inspectors who investigated the blast.

The officials, who were directed to appear in court Jan. 26 to answer the charges, were Harry Spare, superintendent; John P. Daley, mine foreman; and Frank Danna and Thomas W. Jones, assistant mine foremen.

Illinois Laboratory To Test Mine Gases

With the recent opening of the University of Illinois laboratory of the Illinois State Department of Mines and Minerals, Illinois is thought to be the first state to establish such a laboratory in conjunction with its mines department. The laboratory will be used to test specimens of gas, coal dust and air from state mines and the findings are expected to assist in reducing mining hazards.

The new facility will occupy 2,500 sq. ft. of floor space in the Mining and Metallurgical Engineering Building of the university and will have a staff of 13 technicians and office workers. Rolf W. Roley, formerly a mining engineer with the Illinois State Geological Survey, has been appointed supervisor, under the direction of Prof. Harold L. Walker, head of the university's department of mining engineering.

St. Lawrence Seaway Faces Tough Battle

Renewed spirited opposition, plus the necessity for immediate consideration of major legislation such as European relief, inflation, taxes and appropriations, may most likely prevent final passage of the St. Lawrence Seaway and Power Project resolution at this session of Congress, a *Coal Age* staff correspondent in Washington reports.

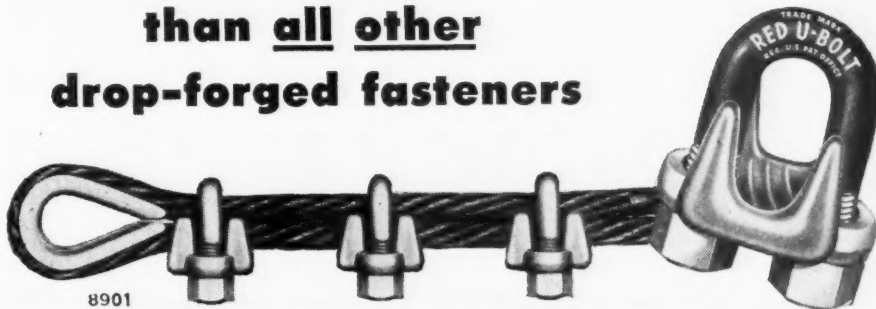
While odds are thought to favor final passage of the resolution in the Senate, the recent four-man minority



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opposition report from the Foreign Relations committee on last year's hearings has bolstered the fight of the many groups which are opposing the measure. The four senators making the minority report were White of Maine, Lodge of Massachusetts, Connally of Texas and George of Georgia. The resolution was favorably reported on by nine members of the committee. Although debate on the floor of the Senate is now in order, continued bipartisan opposition and the Senate's heavy schedule may prevent final consideration and passage for some time.

In the meantime the House is to continue hearings on an identical resolution before its public works committee, which is expected to approve the measure. However, floor action is questionable, with even enthusiastic supporters of the measure reportedly doubting that it will reach a vote this year.

Hanna Offers N. Y. Trip As Safety Slogan Prize

The Hanna Coal Co., St. Clairsville, Ohio, last month offered as the top prize in its contest for a 1948 safety slogan, a return airplane trip to New York for the winning miner and his wife, tickets to a show and the usual trimmings of a trip to Broadway. In addition, winners at each of the company's mines were to receive at least \$75 worth of merchandise.

All U.M.W.A. workers employed by the company were eligible to make as many entries as they wished. Winning entries from each of the operations were to be judged by top company officials to select the winner of the grand prize. Winning slogans "are to be used in the interest of promoting safety at the Hanna mines," the company said. Last year's slogan was, "Safety Now."

Freight Rates Upped; Coal Haulage a Record

The Interstate Commerce Commission Dec. 30 announced a new increase in rates for railroads, water carriers and freight forwarders, effective until June 30, 1948. The new rates supercede the temporary increases granted last October and are double the increases allowed at that time, being approximately 20 percent over rates in effect before the October action.

Under the latest order, basic line-haul rates may be increased 20c. a net ton and 22c. a gross ton on coal, coke and lignite, with a single increase applied to the rail rates where there is an intervening movement by water. These boosts are double those authorized last October. The ICC said it was convinced that this action was needed at this time and that it would now undertake to study the records of the hearings conducted in recent

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Outstanding quality is never a matter of chance, consequently there are definite reasons for the consistent top-flight performance of Pre-formed "HERCULES" (Red-Strand) Wire Rope. Material... design... experience... fabrication... performing—all are contributing factors that add up to its plus value, which mean longer life and lower operating costs.



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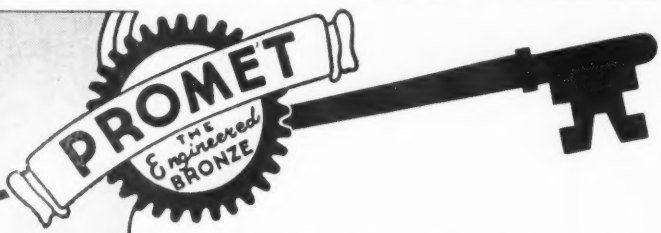
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months, to establish a permanent increase. Increased railroad wages and costs of materials, fuel and supplies necessitated the change immediately, the ICC said.

In a statement Jan. 7, William T. Faricy, president, Association of American Railroads, announced that the railroads set a new record in moving coal in 1947, in spite of the shortage of railroad cars. Tonnage handled was about 520,000,000 tons, he said, or around 1,000,000 tons above the previous record set in 1926. Dumping of coal over the lower Lake Erie docks during the 1947 season totaled 52,500,000 tons, 3,000,000 tons ahead of 1946. Bituminous coal moved to New England was 20,000,000 tons, up 1,300,000 tons from 1946, he reported.

Mr. Faricy also stated that the railroads obtained delivery on approximately 18,000 new hopper cars during 1947, putting deliveries ahead of retirement of worn-out cars. As of Jan. 1, the railroads have approximately 43,000 new hopper cars on order.

Safety Hats Accepted, Miners End Walkout

Approximately 1,700 miners at the Vesta No. 4 mine, Jones & Laughlin Steel Corp., California, Pa., were to return to work Jan. 2, after a three-day walkout over the company's rule that they should wear safety hats, in accordance with the Federal Mine Safety Code. The miners demanded that the company comply 100 percent with the 15 safety rulings ordered as a result of a recent inspection before they would wear the safety hats. The company maintained it was putting the rulings into effect as rapidly as possible in the face of present material shortages.

The miners finally voted to return to work and wear the safety hats after the company agreed to put the safety measures into effect as fast as possible. A similar order on safety hats by the Coal Mines Administration last June was resisted by the miners and a walkout at that time was avoided by the CMA's not pressing the order.

Pennsylvania Townships Act to Tax Coal Mined

Following a decision of the Pennsylvania state supreme court last November upholding the constitutionality of a state law permitting school districts to tax anything not already taxed by the state, at least one school district was reported last month as having levied a tax on coal and several others were reported planning early passage of such measures.

The Tremont Township school board unanimously adopted an ordinance calling for a tax of 5c. a ton on

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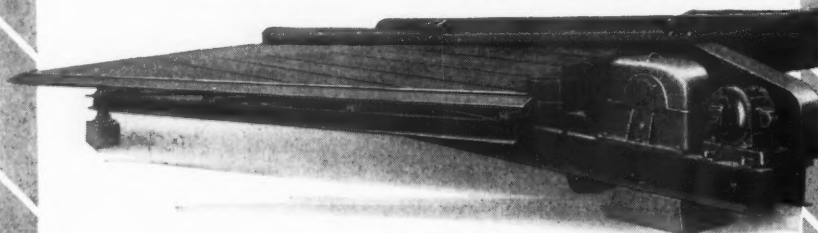
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unprepared deep-mine coal and 10c. a ton on unprepared strip-mine coal mined from within the township. The tax was due to go into effect 30 days after its passage, during which time coal operators affected could appeal it through the Schuylkill County courts.

The Reilly Township school board was reportedly planning passage of a similar ordinance at its meeting Jan. 9, but the tax would be 5c. a ton levied on prepared coal.

The Cooper Township in Clearfield County announced that it intended to resume action at its Feb. 8 meeting on a one-percent tax on all coal mined in the district. The tax was approved by the board last October but further action on its was deferred, pending the state court's decision.

Members of the Pittston Township school board voted Jan. 6 to initiate a tax of 10c. a ton on all strip coal mined in the township. The board instructed its solicitor to study the legality of such a measure and prepare a resolution covering the tax.

Operators Challenge Ohio Strip Mine Law

The constitutionality of the Ohio law passed last June requiring the licensing of strip operators, and leveling and reforestation of stripped land was challenged Jan. 10 in a petition filed by 12 mining companies in Common Pleas Court, Columbus, Ohio.

The petition asked that state officials be enjoined from enforcement of the law on the basis that it was unconstitutional. The operators contended that the law would require coal companies to spend more money rehabilitating the land than it was worth before it was mined. They also maintained that strip mining does not produce the evils the legislature said it was attempting to curb and that, in general, the mined land had no other value. Adequate standards of enforcement were not prescribed by the law, it was also said, with legislative powers thus being delegated to state officials.

The coal companies which entered the action are: James Bros. Coal Co.; A. & A. Coal Co.; Pittsburgh Consolidation Coal Co.; Crescent Valley Mining Co.; Hanna Coal Co.; Virginia Mining Co.; Jefferson Coal Co.; Blue Star Mining Co.; Noble Coal Co.; Ohio & Pennsylvania Coal Co.; Jefferson Co.; and the Powhatan Mining Co.

Earlier on Dec. 31, Dean L. L. Rummell of the Ohio State University College of Agriculture, who was to take over enforcement of the law when it became effective Jan. 1, stated that a grant of \$50,000 would be asked of the state emergency board for its administration. Of this amount, \$40,000 would be used for research and \$10,000 for inspection. No funds for implementing the law were provided by the legislature.

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Bonus Built—Extra Strength! Every single one of the great new Ford Trucks for '48 is Bonus Built... designed and built with a margin of *extra strength* in every vital part. But that is only *part*

of this vital truck building principle...

Bonus Built—Work Reserves! This *extra strength* provides **WORK RESERVES** that pay off for truck operators in two important, money-saving ways...

Bonus Built—Greater Range of Use! These Bonus Built **WORK RESERVES** give Ford Trucks a *greater range of use* by permitting them to handle loads beyond the normal call of duty! That means that Ford Trucks are *not* limited to

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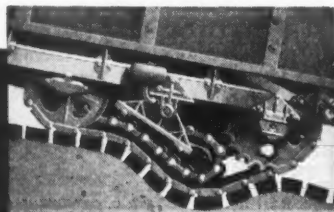
Does that steep grade on your refuse dump ever bog down your trucks when the weather really gets bad? If so the LINN HAFTRAK may be the solution to your disposal problem. LINN's will work *every day*, no matter what the weather and ground conditions. Grades up to 25% won't even slow them down, and with a 20 to 25% road grade on your dump you can dispose of more refuse without increasing the disposal area.

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Supervisors Honored For Mine-Fire Heroism

Ray Williams, day mine foreman, and Everett Jordan, assistant night foreman, King's mine, Princeton, Ind., were presented with special plaques for heroism by Gov. Ralph F. Gates of Indiana, Jan. 2, in recognition of their refusal to leave the burning mine last Nov. 10 until all their fellow workers were safely away from the danger area. The citation stated that the two men, together with three others, were underground trying to stop a fan at an airshaft when a series of explosions sent flames an estimated 100 ft. above the tippie. The two men barely made their way out of the one exit, after making sure their three associates were safe, when a tremendous fall occurred in the area they had just left.

Anthracite Water Study Sought in Congress

A bill to authorize \$560,000 for an engineering study of the mine-water problem in the Pennsylvania anthracite region was introduced last month in the House of Representatives by Rep. I. D. Fenton (R.), Mahanoy City, Pa.

The study would be one of the functions of the new Anthracite Research Laboratory to be erected at Schuylkill Haven, Pa., and would be conducted by the U. S. Bureau of Mines, with authority to call in consulting engineers and technicians. The study should be undertaken to obtain the necessary information and present a solution to the water problem, the bill stated.

Borough Awarded \$500,000 In Mine Damage Suit

In a ruling handed down Dec. 25 by Judge Thomas F. Farrell, culminating a lengthy legal fight, the Borough of Kingston, Pa., was awarded \$500,000 from Luzerne Anthracite, Inc., for damages from subsidence of streets, sewers and other property allegedly caused by illegal and negligent underground mining within the borough's limits. A permanent injunction against such illegal mining operations also was granted the borough.

The borough had sued Luzerne Anthracite, Inc., latest operator of the properties involved, the East Boston Coal Co., and various individuals, owners and lessors of coal land within the area after a series of subsidences had caused sewers to clog, sections of streets to fall and depressions to appear that endangered life and property. Luzerne Anthracite, Inc., denied that illegal and negligent operations had been carried on. A preliminary injunction against further mining was granted and the right of the borough

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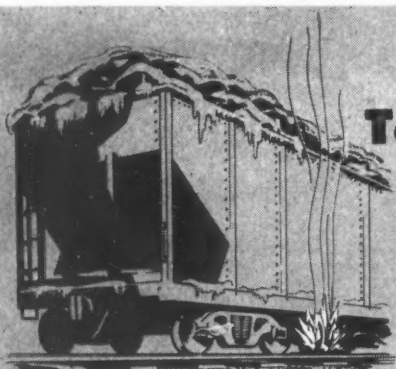
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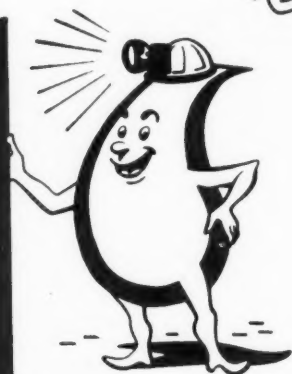
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Unloading coal frozen in the hopper can be a costly, time-consuming operation. You can avoid this situation by the controlled application of PERMATREAT COAL SPRAY. This oil spray is easy to apply, does an effective job at minimum cost and assures satisfaction from your dealers and industrial consumers.

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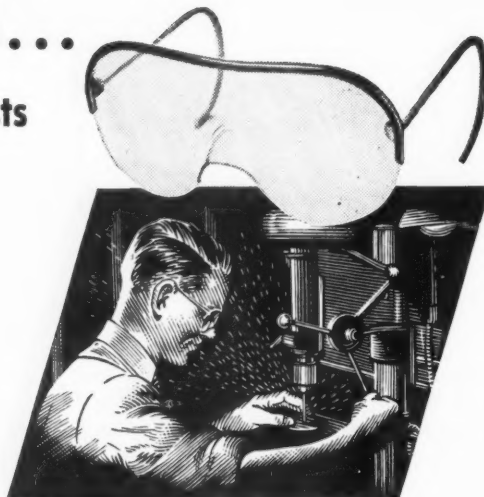


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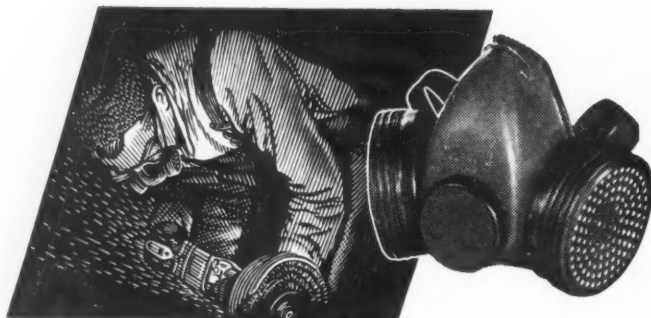
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239 WASHINGTON ST., READING, PA., U. S. A.

to restrain allegedly illegal mining and receive damages also was argued in the court.

In its ruling the court found that the coal had been removed without leaving adequate pillar support or replacing such support with artificial support, with the consequent subsidence causing the damage alleged.

Obituary

Anthony Mosolino, president, Markson Coal Co., Goodspring, Pa., died Dec. 31 following a heart attack.

Daniel W. Hayes, 66, general superintendent, Ferguson Coal Co., Clinton, Ind., died Dec. 23 in the Vermilion County hospital. He had been superintendent of the company for more than 30 years.

Benjamin Messing, 55, mine foreman, King's mine, Princeton, Ind., was killed Jan. 5 by a rock fall in the mine while clearing away slate from equipment covered following the fire that closed the operation Nov. 10.

Association Activities

Illinois Society of Coal Preparation Engineers & Chemists has elected the following officers for 1948: president, J. Laning Dress, preparation manager, Binkley Coal Corp., DuQuoin, Ill.; vice president, Walter A. Hamilton, mill superintendent, Rosiclair Lead & Fluorspar Co., Rosiclair, Ill.; vice president, Howard Stelzriede, preparation manager, Chicago, Wilmington & Franklin Coal Corp., West Frankfort, Ill.; and secretary-treasurer, Carl E. Campbell, industrial engineer, Illinois area, Shell Oil Co. Regular meetings of the society will be held the third Friday of each month at the Benton Country Club, Benton, Ill., with dinner beginning at 6:30 preceding the meetings. Topics of general interest to coal and other mining men are discussed and visitors in the area are cordially invited to attend.

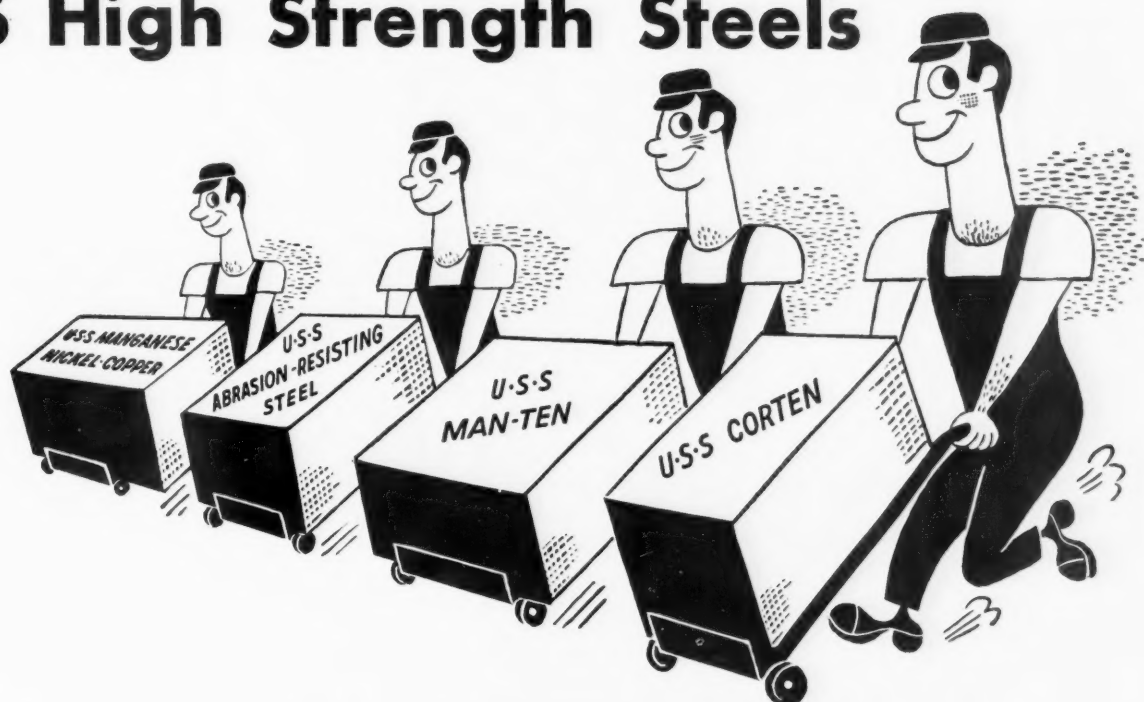
Preparation Facilities

Ashland Hydrotator Co., Ashland, Pa.—Contract closed with Wilmot Engineering Co. for one 2½-ft.-diameter Wilmot Hydrotator to prepare rice coal; feed capacity, 18 t.p.h.

Darkcorner Coal Co., Paxinos, Pa.—Contract closed with Wilmot Engineering Co. for one Type A Wilmot Simplex jig to prepare stove and nut coal; feed capacity, 15 t.p.h.

Locust Valley Coal Co., Mahanoy City, Pa.—Contract closed with Wil-

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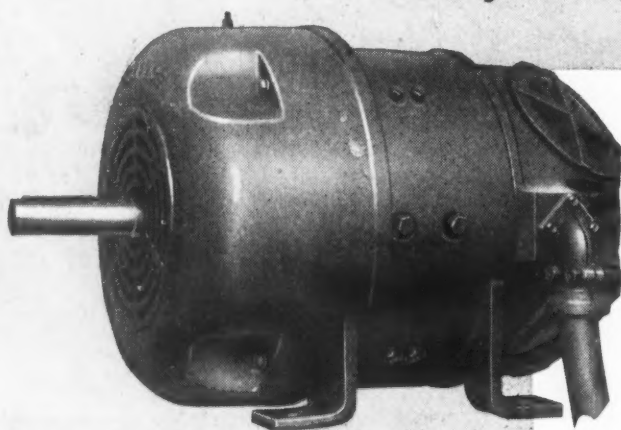
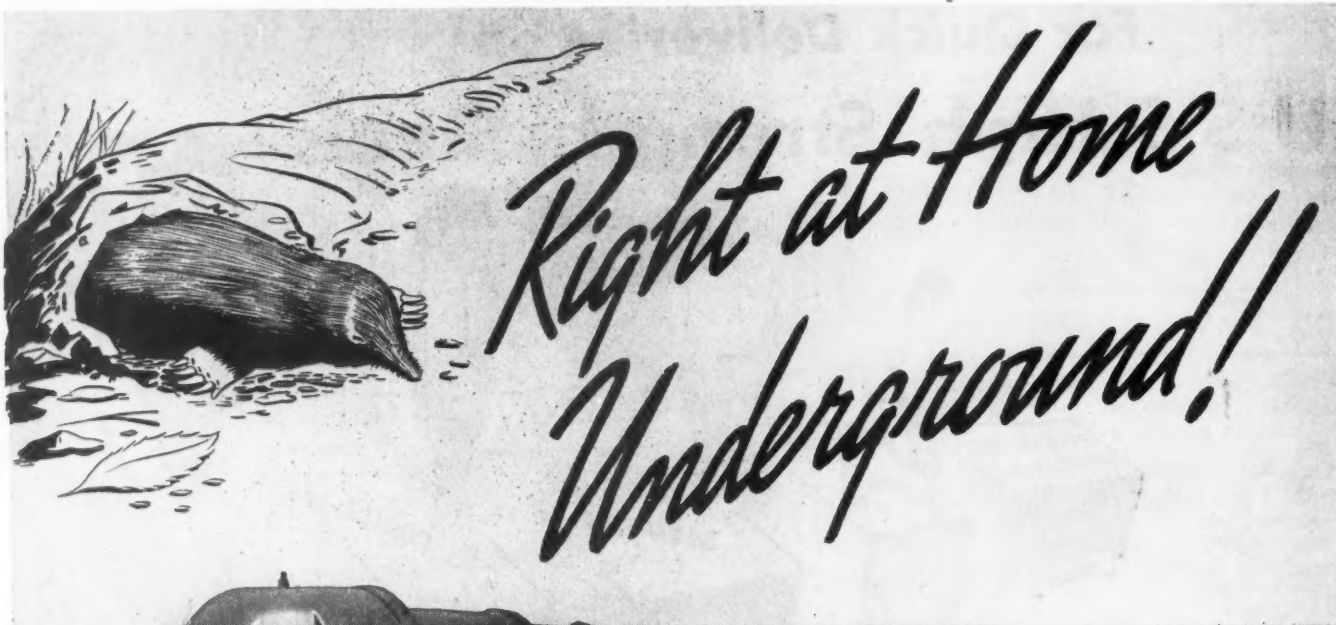


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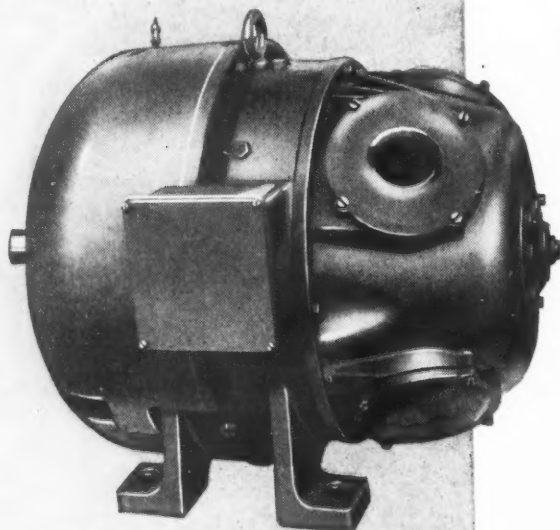
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LOS ANGELES (54)	Slauson Avenue (Between Alameda and Santa Fe)	LAfayette 0102	ST. LOUIS (3)	311 S. Sarah St., P. O. Box 27	LUcas 0440
			TWIN CITY	2545 University Ave., St. Paul (4), Minn.	NEstor 7311

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Reliance Fully-enclosed, Fan-cooled D-c. Motor for use where permissible equipment is not required.

With Reliance Motors especially designed, electrically and mechanically, for bruising jobs underground, you enjoy exceptional freedom from tonnage losses due to power failures. These motors that are right at home "down under" have vital parts thoroughly protected against coal dust and moisture. They *stay* clean and dry—last longer with less maintenance. You make a *wise choice* when you invest in modern mining equipment powered by Reliance Motors.

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RELiance^{A-C}_{D-C} MOTORS

mot Engineering Co. for one 6-ft. Wilmot Hydrotator to prepare No. 4 coal; feed capacity, 50 t.p.h.

Franklin I. Miller, Ravine, Pa.—Contract closed with Wilmot Engineering Co. for two 2½-ft.-diameter Wilmot Hydrotators to prepare pea and buckwheat No. 1 coal; total feed capacity, 40 t.p.h.

Racket Brook Coal Co., Carbondale, Pa.—Contract closed with Wilmot Engineering Co. for one 2½-ft.-diameter Wilmot Hydrotator to prepare Nos. 4 and 5 coal; feed capacity, 15 t.p.h.

Renninger Coal Co., Inc., Zerbe, Pa.—Contract closed with Wilmot Engineering Co. for one Type A Wilmot Simplex jig to prepare stove and nut coal; feed capacity, 15 t.p.h.

G. & M. Coal Co., Rocky Glen, Pa.—Contract closed with Menzies Separator Co. for one 2-ft. Menzies cone to clean No. 1 buckwheat coal; feed capacity, 7 t.p.h.

Markson Coal Co., Goodspring, Pa.—Contract closed with Menzies Separator Co. for one 4-ft. Menzies cone to clean No. 4 buckwheat coal; feed capacity, 22 t.p.h.

Morgan Mines, Inc., Marion, Ill.—Contract closed with McNally-Pittsburg Mfg. Corp. for complete tippie and preparation plant, capacity, 200 t.p.h.; facilities include crushing equipment to reduce run-of-mine to 6-in. minus; 6x0-in. coal to be washed in a McNally-Norton automatic compound washer with middlings retreatment circuit; complete classifying and rescreening facilities capable of reducing entire output to screenings and premium stoker grades; minus ¾ in. centrifugally dried in McNally-Carpenter centrifugal dryer.

Cardinal Coal Co., Madisonville, Ky.—Contract closed with McNally-Pittsburg Mfg. Corp. for washer addition to existing raw-coal screening equipment, capacity, 400 t.p.h.; 6x0-in. coal to be processed in McNally-Norton washers with middlings crushing and retreatment circuits; facilities include complete classification of washed coal, crushing of plus screening sizes to screening grade, with complete water clarification system.

Blythe Bros. Co., Charlotte, N. C. (for mine at Red Jacket, W. Va.)—Contract closed with McNally-Pittsburg Mfg. Co. for raw-coal screening plant, capacity, 300 t.p.h.; consisting of screening units capable of producing four grades, complete with feeder, lump and egg loading booms.

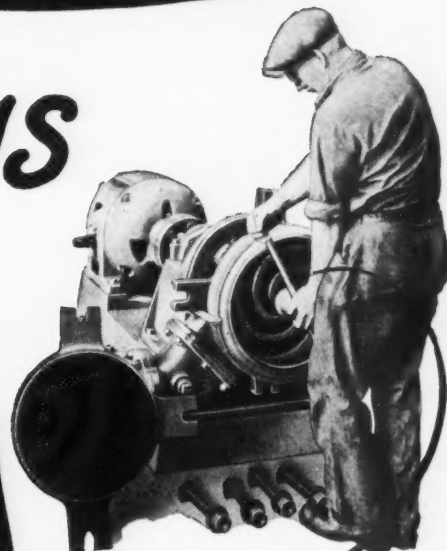
Universal Construction Corp., Salem, Va. (for mining operation at Richlands, Va.)—Contract closed with McNally-Pittsburg Mfg. Corp. for raw-coal preparation plant, capacity, 300 t.p.h.; equipped with screening unit capable of producing four grades; complete with feeder, lump and egg loading booms.

Impeller and renewable shaft sleeve removed...

WITHOUT DISTURBING PIPING!

MORRIS TYPE "R" SLURRY PUMP

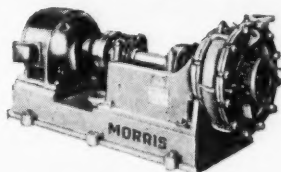
• Quick, easy access to impeller assures minimum lay-up time



To take out impeller and shaft sleeve, you merely remove four bolts and take off the end cover. No need to touch the suction and discharge piping. It's just as simple as a boy's mechanical set.

Stuffing Box maintenance at an all-time low

The Morris Type R differs radically from conventional end-suction type slurry pump. This newest Morris pump takes its suction from the driveside only. Hence, the packing is subjected to suction or positive head pressures only. The stuffing box is not nearly as vulnerable to entrance of solids. Not affected by fluctuating pressures in the sealing water main.



Easy Impeller Adjustment

Worn clearances on suction side of impeller can be very easily closed by four adjusting screws. This adjustment moves the entire rotating assembly as a unit, including impeller shaft, bearing and bearing housing.

FOR YOUR MINING OPERATIONS, use the Morris Type R Slurry Pump for mixtures containing ore concentrates . . . tailings, slag and residue from filters and classifiers . . . for handling all types of caustic or acid mixtures containing abrasives or solids.

Every Morris Pump is backed up by the engineering skill of 83 years' experience. It will meet your pumping requirements and do the job with **less maintenance . . . less trouble . . . less cost.**

MORRIS MACHINE WORKS, Baldwinsville, N. Y.
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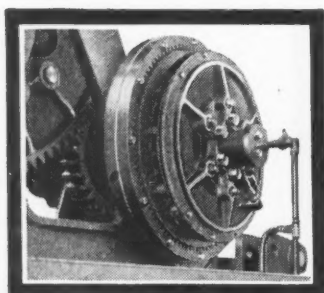
CENTRIFUGAL PUMPS

Shovel Operators Are Talking About . . .

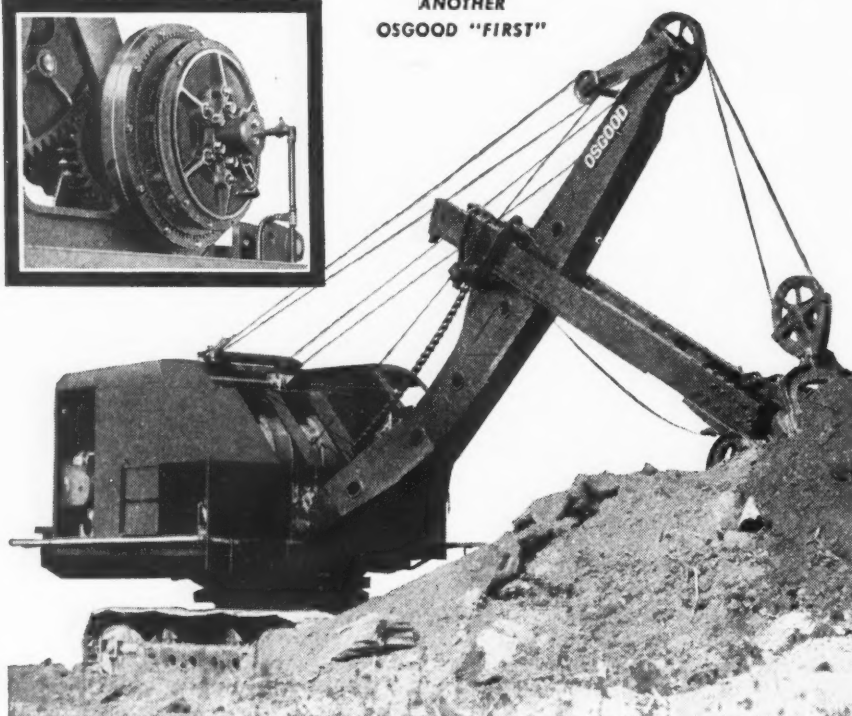
➡ A revolutionary new power shovel clutch that provides smooth, positive action in place of jerky, uncontrolled performance . . . a clutch that seldom requires adjustment . . . a clutch with only one working part, and without a single cam, lever, bolt, piston or valve.

➡ It's a power shovel clutch with direct air power that assures positive control, without any "grabbing" effect . . . a clutch that needs no mechanical attention . . . a clutch whose simple operation automatically compensates for any wear on the clutch linings.

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This flexible air tubing is ready for immediate, easy installation. On account of its flexibility, it can be put up or taken down in a fractional part of the time required by more rigid means of face ventilation.

Write for free sample and full information.

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412 Poplar Street, St. Louis 2, Mo. *

Waterloo Coal Co., Waterloo, Ohio—Contract closed with McNally-Pittsburg Mfg. Corp. for complete tipple with picking and screening facilities to produce 5-in.-plus lump, 5x1¼-in. egg and 1¼x0-in. nut slack on special combination picking table screen.

Triple S Coal Co., Mine No. 2, Augusta, Ill.—Contract closed with McNally-Pittsburg Mfg. Co. for stoker-coal-screening addition to present tipple with capacity of 200 t.p.h.; stoker plant to produce normally 1x¼-in. and ¾x0-in.; to be equipped with two-stage crushing circuit consisting of two McNally-Pittsburg coal crushers, with crushed resultants screened on three Allis-Chalmers Ripl-Flo screens.

New Mining Companies

Unconfirmed reports received list the following companies, among others, as having been incorporated to mine coal, with authorized capital and incorporators as listed:

Kentucky

A. & A. Coal Co., Dongola; \$10,000; A. J. and B. C. Adams and others; to operate truck mines at Day, Ky.

High Cliff Coal Co., Premium; \$10,000; J. C. Combs, M. B. Frazier, others; to operate truck mines at Kings Creek.

Knox Production Co., Barbourville; \$100,000; Robert F. Voorhees, Bert Ames, Maynard L. Smith; to prospect for and produce coal, oil and gas.

Lilly Coal Co., Freeburn; \$25,000; Milton Tucker, I. Cantor, E. L. Baber.

J. F. Mulligan Coal Co., Greenville; \$100,000; J. F. Mulligan, Sr. and Jr., Allen M. and Jack L. Mulligan.

West Virginia

Appalachian Coal Co., Iaeger, McDowell County; \$10,000; C. O. Davis, Lewis Brannham, Clarence Williams; operations in the Sandy River district.

Beech Glen Coal Co., Rupert, Greenbrier County; \$25,000; G. W. Prince, G. W. Watts, George Ware Watts; operations in the Jefferson district of Nicholas County.

Greene Bros. Coal Co., Madison; \$50,000; L. C. Greene, Emma Greene, C. L. Greene; coal holdings in Boone County.

Hurr Mining Co., Piedmont; \$10,000; David Hurr, George I. Hurr, Francis J. Carey; main operations in Maryland.

S. & S. Coal Co., Herndon, Wyoming County; \$25,000; Frank B. Smith, Carolyn L. Smith, G. E. Fisk.

J. R. Smith Coal Co., Madison; \$20,000; J. R. Smith, Opal K. Smith, Mrs. Isabell Adkins.

Tri-State Coal Co., Wheeling, W. Va.; \$100,000; Attorney Kent B. Hall, Florence N. Bey, Eleanor E. Nickerson; to begin strip-mine development in the Sewell Mt. district of Fayette County.

Coal Publications

Heating Service Guide, by K. C. Richmond. Coal-Heat, 20 W. Jackson Blvd., Chicago 4. 100 pp. 4x8½-in.; paper. Single copies, 50c.; 3 copies, \$1. Readable, pocket-size manual for retailers on common heating problems, stoker service and keeping customers happy.

Electrical Accidents in Bituminous-



Manhattan engineers set out to design a conveyor belt with all the resilience needed to absorb the shock of heavy lumps. The cross-section you see above illustrates how well they succeeded with HOMOCORD, a construction developed specially and *only* for conveyor belt use.

"Rippling Muscles" Construction, is the most apt description of Homocord Conveyor Belt. Each of Homocord's sinews, or strength members, is embedded in muscles of Flexlastics. You can see how this construction dissipates the force of a heavy blow, the

constant pounding of heavy material at loading points.

Homocord Conveyor Belt flexes very easily. It troughs much better and runs true in the idlers. These are all factors for longer belt life. Homocord embodies everything you want for heavy mine hauls . . . a cushioned . . . tough . . . flexible . . . mildew-proof conveyor belt that will cut your costs appreciably.

Manhattan also introduced the first long-lift conveyor belt with Rayon Cord Strength Members. Investigate the advantages of RAY-MAN "Tension Master" Conveyor Belt.

A COMPLETE LINE FOR MINES

Hose, Belting and other rubber products, Engineered by Manhattan for mining efficiency, safety and economy.



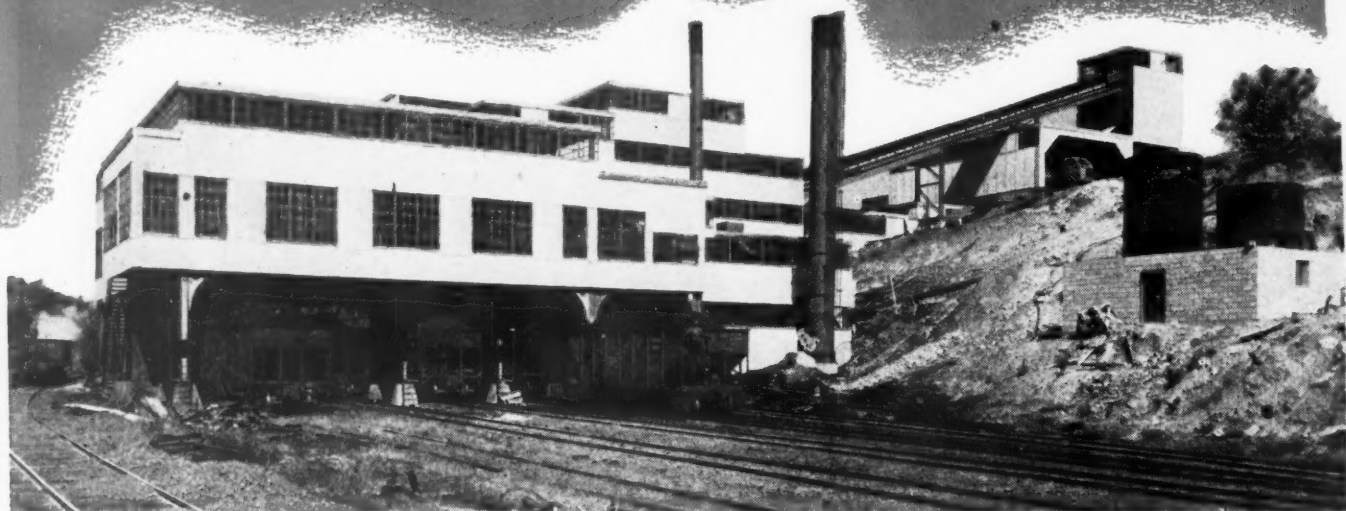
RAYBESTOS-MANHATTAN INC.

Keep Ahead with Manhattan

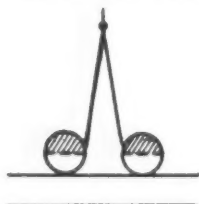
MANHATTAN RUBBER DIVISION

PASSAIC, NEW JERSEY

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They Save The "Fines"
 WITH B-Z SCREENS



**50%
 LONGER LIFE**



Shaded portion of this drawing indicates that screen bars may wear as much as 50%, yet the screen opening does not change.

Coal Washery at the Cuba Mine, United Electric Coal Co.

Save tons of prime coal from the slurry pile with Bixby-Zimmer Round Bar Screens. Formed of round stainless steel bars, B-Z Screens maintain original openings longer — recover more fines in vibrators or centrifuges and at the same time get rid of excess moisture. All welded construction provides a rigid, sturdy, long lasting design that spells fewer changes and reduced screen cost per ton. For dewatering, scalping, deslurring, sizing, there is a B-Z Screen to fit your needs. Investigate their savings today!



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Five Times



MORE POWERFUL THAN DYNAMITE!

Although the release of power from coal is accomplished by different means than are used with dynamite, the measurable power produced shows a one-to-five variance in favor of coal!

—BUT THIS ENERGY CAN BE LOST FROM COAL BY IMPROPER CLEANING

Your coal has a tremendous power potential . . . *but* this energy can be lost from the coal by improper cleaning and preparation methods. The most important markets are buying scientifically prepared coal because they know it will deliver the most power per pound and the most value per dollar. Are your preparation methods producing coal of uniformly high chemical and physical quality to attract and hold these premium markets?



FAIRMONT MACHINERY COMPANY
FAIRMONT, WEST VIRGINIA

Designers and Constructors of Chance Sand Flotation Process for Wet Cleaning and American Pneumatic Separator for Dry Cleaning

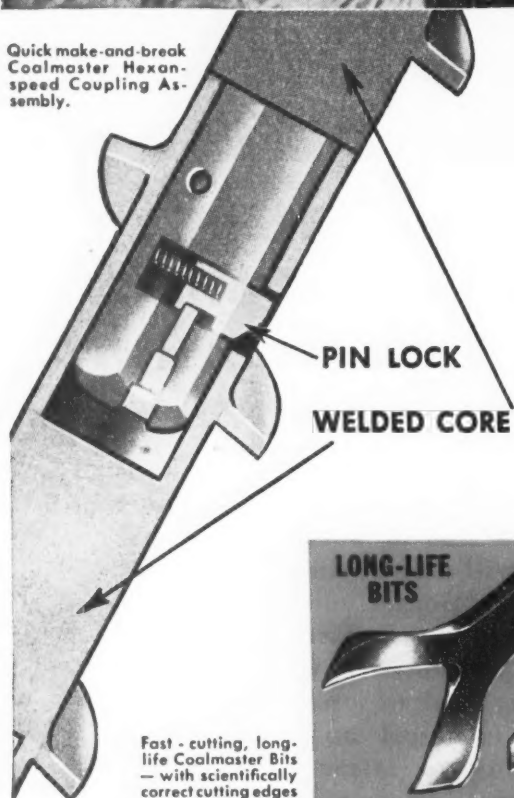


REDUCED DRILLING TIME *translates into* MORE TONNAGE

Drilling time saved by the speedy auger changes with the Coalmaster Hexanspeed couplings—means less time, less cost per bore hole—more shots and more tonnage at the face.

For underground and strip mining operations—there's double time saving—on the way in and on the way out—augers and drill heads are added—disassembled—and changed in seconds instead of minutes and hours. That translates in more production time!

Quick make-and-break Coalmaster Hexanspeed Coupling Assembly.



Here's the time-saving, efficient Coalmaster Hexanspeed coupling in phantom view—to show the quick make-and-break feature that streamlines drilling operations. The hex shank with its pin-lock snaps right into the snug fitting hex socket—and the Spir-L-Weld flight of Coalmaster augers automatically fits flush and unbroken—on both drill head and auger couplings.



Fast-cutting, long-life Coalmaster Bits—with scientifically correct cutting edges and accurate bevel.



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Coal Mines, Coal-Mine Accident Prevention Course, Sec. 6. U. S. Bureau of Mines, Miners' Circular 59. 93 pp. 5¼x9½-in.; paper. 30c., Government Printing Office, Washington 25, D. C. The sixth of a series of seven booklets on accident prevention. This one covers surface and underground circuits and equipment as well as treatments in case of accident. An appendix includes questions for class discussion.

Some Observations on German Coal Research and Developments, by H. H. Lowry and H. J. Rose. U. S. Bureau of Mines, I. C. 7422. 27 pp. 8x10½-in.; paper; mimeo. Free. A summary of observations at six different research laboratories in Germany.

Permissible Mine Equipment Approved to Jan. 1, 1947, with Appended List of Available Flame-Lamp Fuels, by A. B. Hooker. U. S. Bureau of Mines, I. C. 7432. 44 pp. 8x10½-in.; paper; mimeo. Free. A revision of previous lists, with additional equipment approved since Jan. 1, 1945.

Thickness of Bituminous-Coal and Lignite Seams Mined in the United States in 1945, by W. H. Young and R. L. Anderson. U. S. Bureau of Mines, I. C. 7442. 17 pp. 8x10½-in.; paper; mimeo. Free. Average seam thickness for all bituminous mines was 65 in. in 1945, two inches thicker than in 1920.

A Mine Air-Conditioning Chart, by G. E. McElroy. U. S. Bureau of Mines, R. I. 4165. 23 pp. plus 7 pp. of illustrations. 8x10½-in.; paper; mimeo. Free. Construction and use of an all-pressure psychrometric chart that provides rapid determination of psychrometric data and rapid solution of air-conditioning problems in very deep mines and mines at high elevation above sea level.

Sulfur in Low-Gravity Fractions of Some Bituminous Coals, by Thomas Fraser and W. L. Crenztz. U. S. Bureau of Mines, R. I. 4167. 6 pp. plus 4 pp. of illustrations. 8x10½-in.; paper; mimeo. Free. Pyritic sulfur shows a direct relationship to specific gravity, decreasing to almost nothing in the very lightest fractions of coal, indicating that a substantial reduction in sulfur could be obtained by washing at lower gravities than now used. However, a great loss in yield would be likely at gravities below 1.40.

Investigation of Coal Deposits for Local Use in the Arctic Regions of Alaska and Proposed Mine Development, by A. L. Toenges and T. R. Jolley. U. S. Bureau of Mines, R. I. 4150. 19 pp. plus 7 pp. of illustrations. Description of Alaskan areas investigated in 1946 by engineers of the Coal Division, Fuels & Explosives Branch, Bureau of Mines, together with plans suggested for development of coal deposits, to provide local



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When costly equipment shutdowns plague production because power supply cables don't measure up to the job—switch to Deltabeston,* and take a load off your repair crews.

Deltabeston apparatus and motor lead cables help you fight production tie-ups. They're designed and built to keep mine equipment hard at work in spite of overheating and rough use.

Tough Deltabeston cables are protected against heat with two layers of felted asbestos insulation. A varnished fabric layer resists moisture. A sturdy, asbestos braid covering takes abrasion and rough handling in its stride. And it's a natural for protection against the ravages of greases and oils.

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**Beat Motor Heat with
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If you do your own motor winding — or, if you send it to an outside shop, be sure to specify Deltabeston Magnet Wire. It's made in round, square, and rectangular shapes, and is insulated with asbestos or glass for lasting protection and service.

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WIRES and CABLES

GENERAL  ELECTRIC

fuel for natives and government establishments.

Washability Studies of the Clark and Gholson Coal Beds at Boothton, Ala., by B. W. Gandrud and H. L. Riley. U. S. Bureau of Mines, R. I. 4160. 11 pp. plus graphs. 8x10½-in.; paper; mimeo. Free. Screen-sizing and float-and-sink data, obtained with the cooperation of producers and the University of Alabama.

Annual Report of Research and Technologic Work on Explosives, Explosions, and Flames, Fiscal Year 1946, by Bernard Lewis. U. S. Bureau of Mines, R. I. 4176. 62 pp. plus 28 pp. of illustrations and tables. 8x10½-in.; paper; mimeo. Free. Summary of experiments and developments in explosives, flames and combustion, inflammability of gases and vapors, coal-mine and dust explosions, explosives utilization and other special projects.

Wash and Change Houses at American Mines, by D. Harrington and J. H. East Jr. U. S. Bureau of Mines, I. C. 7423. 44 pp. plus 18 pp. of illustrations. 8x10½-in.; paper; mimeo. Free. Summary of state laws on wash and change houses, with a survey of location, construction, heating and ventilation, floor plans, design, sewage disposal and special features. Recommendations for construction and improvement.

Determination of Carbon Monoxide by Absorption in the Haldane-Type Gas-Analysis Apparatus, by L. B. Berger. U. S. Bureau of Mines, R. I. 4187. 6 pp. plus 5 pp. of illustrations. 8x10½-in.; paper; mimeo. Free. Description of method and results of analyses obtained with a Haldane-type apparatus to determine, by absorption in a chemical reagent, the presence of carbon monoxide in low concentrations not readily determined by other methods. Range of concentrations handled by this method is from 0.2 to 0.5 percent.

How to Prepare and Maintain a Supervisor's Policy Manual. American Management Assn., 330 West 42nd St., New York 18, Research Report No. 11. 71 pp. 6x9-in.; paper. \$3. A survey of the practices of a number of companies that prepare supervisors' manuals. Techniques of collecting and appraising source material, writing the policies and procedures, coding and indexing them and revising the manual as new material and changes develop.

Compressed Air Handbook. Compressed Air & Gas Institute, 90 West St., New York 6. 387 pp. 6x9¼-in.; cloth. \$3 in U.S.A., \$3.50 elsewhere. Applications of compressed air and gas, types of compressor installations, portable tools and rock drills, and methods of getting maximum efficiency. Includes engineering data and test procedures, with tables and formulas on costs, friction losses, required horsepower and lubrication.



"Wouldn't Buy Any Other Type"

... Says Veteran
Coal Mine Operator

A "real classifier" is the way B. T. Chapman, coal mine owner of Collinsville, Illinois, describes his Plat-O Vibrating Screen. "I wouldn't buy any other type, I like its principle of operation and it will do its job under any condition."

The 4' x 10' triple-deck Plat-O, installed at the Chapman mine over a year ago, screens all of the coal mined in a seven-hour day. "It could easily handle 700 tons a day," Mr. Chapman states, "but at present it actually is required

to screen 350 to 500 tons." His Plat-O produces four sizes of coal, 6-inch lump, 2 x 6 egg, 1 x 3½ nut, and 1½ x 0 screen.

Mr. Chapman is just one of the many satisfied operators who have found Plat-O performance profitable. Write to the Deister Machine Company for information on how Plat-O Vibrating Screens can improve your operations.

DEISTER MACHINE CO.
Fort Wayne 4, Indiana



DEISTER SCREENS

DEISTER MACHINE COMPANY • Ft. Wayne 4, Ind.

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**GREATER
CONTACT AREA**

IF IT ISN'T WIDE ENOUGH, IT ISN'T GOOD ENOUGH to meet today's design problems. Norma-Hoffmann extra wide "Cartridge" Bearing gives you 43% to 85% greater contact area between shaft and bearing bore and between housing and bearing O. D., as compared to the conventional width bearing. This eliminates the need for lock-nuts and results in greater shaft strength as it is unnecessary to cut locknut threads. Slippage and peening are also prevented.

In addition, the "Cartridge" Bearing gives you (1) Longer period between re-lubrication because it holds 100% more grease—(2) Added load-carrying capacity because full sized balls are used.

Also available under license from the Marlin Rockwell Corp., Jamestown, N. Y.

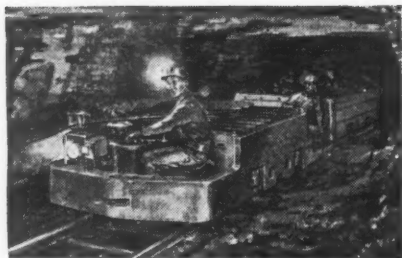


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America's #1 Sealed Bearing

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Equipment News

More Detailed Information and Descriptive Literature Normally Are Available on Request Directly to the Manufacturer

Wire-Rope Lubricant

A new lubricant known as Kling-fast I. P., recently developed by the Brooks Oil Co., Pittsburgh, Pa., now being used by some major wire-rope manufacturers, is said to offer the user exceptional protective characteristics. The product is a leaded petroleum compound without fillers, is negative in corrosion factors and hardening in type, while retaining affinity to metals and remaining flexible to temperatures as low as minus 40 deg. F.

The lubricant is said not to be affected by heat within the range of melting points, which are high for this type of petroleum product. The covering is extremely adhesive, thin in nature and hardens to a flexible coating, but is not sticky, offering an unusual resistance to metallics and other abrasive substances that adhere to most lubricants. The flexibility of the rope is increased and is said to be retained over a longer period with the rope wear appreciably reduced.



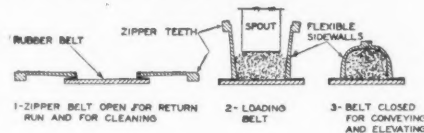
SAFETY GOGGLE—Lightweight AO 607 safety goggle, featuring all-plastic frame with a single plastic acetate lens said to provide maximum vision, is recommended by the American Optical Co., Southbridge, Mass., for wear directly over eyes or spectacles for frontal protection on machine-tool jobs, spot-welding, etc.

to provide living-room comfort with more space and better ventilation, adding up to 7 in. greater width and also more headroom. New styling of the entire truck has been effected and a one-piece windshield provides increased visibility.

The 1948 Ford line includes a wide range of models and capacities, from the nominally rated ½-ton series on a 114-in. wheelbase with a deluxe delivery model and standard pickup, panel and stake bodies, up to the extra-heavy-duty 3-ton on 135-, 159- and 195-in. wheelbases.

Conveyor-Elevator

Stephens-Adamson Mfg. Co., Aurora, Ill., has announced a new "Zipper," inclosed-belt, continuous conveyor-elevator, for handling coal, and similar pulverized or small-lump materials. The material is conveyed and elevated in any direction in a solid mass entirely inclosed within the belt which, at the discharge point, is automatically opened for complete discharge and cleaning the last particles of material from the belt.

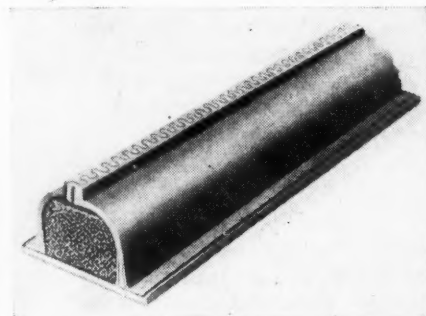


Trucks

The new 1948 line of Ford trucks recently announced is completely new from the wheels up and represents its first post-war product, according to the Ford Motor Co. Two new series—F-7 and F-8, with maximum gross-vehicle weights of 19,000 and 21,500 lb., respectively—are the largest ever manufactured by Ford. Another new series is the 6-cylinder cab-over-engine model. Three new power

plants are available for the new trucks, it is said—a 95-hp. 6-cylinder engine, a 100-hp. V-8 and a 145-hp. V-8.

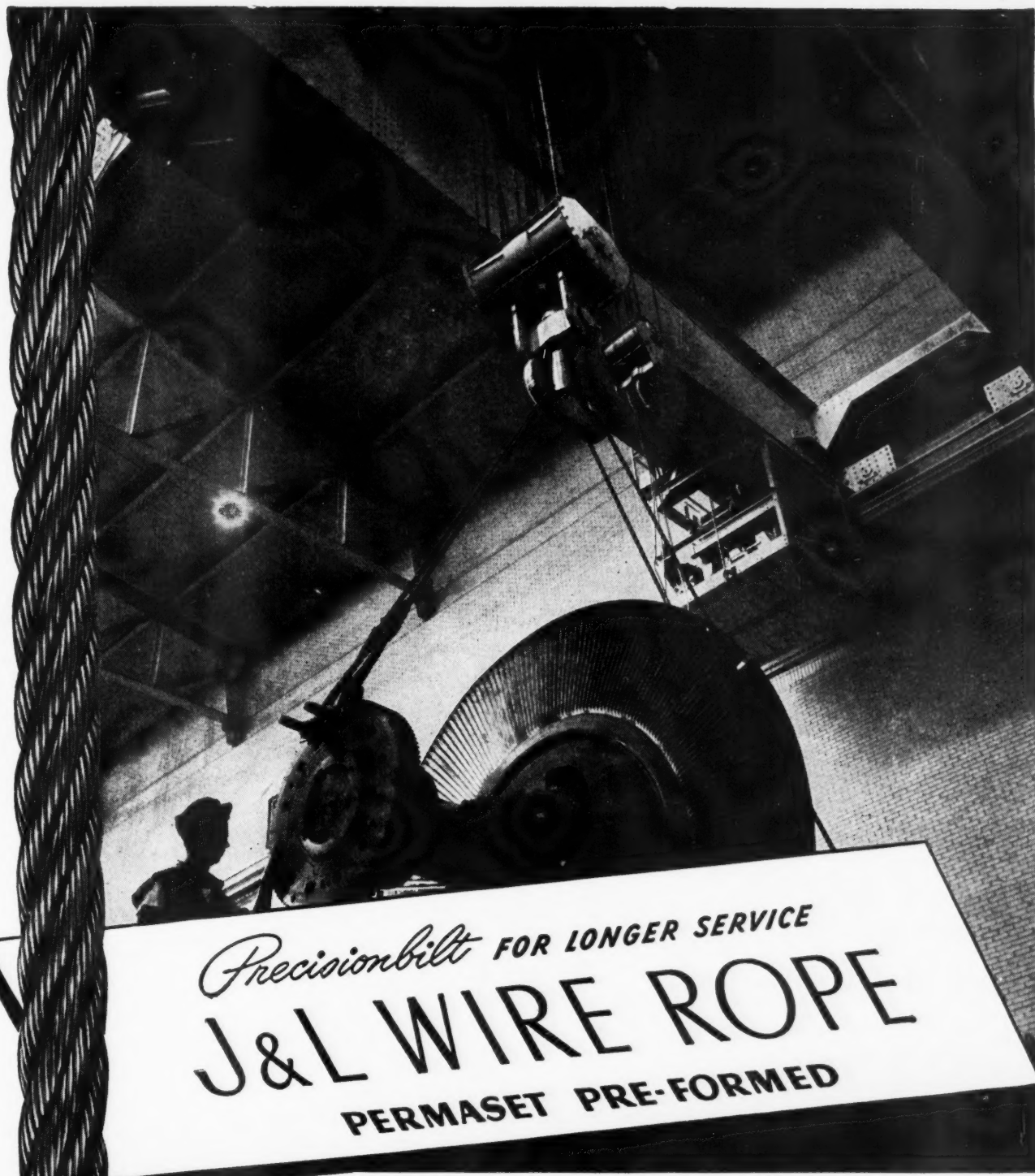
Among the features of the new line cited by the manufacturer are greater front-end strength achieved through improved sheet-metal suspension and heavier construction, heavier fenders with greater tire clearances and a heavy channel-steel front bumper attached directly to extended frame side rails. Cab design is said



According to the manufacturer, test installations in operation for several years show that the Zipper belt, manufactured for S-A by the B. F. Goodrich Co., will convey over long distances and to considerable heights without spillage, breakage or contamination of the product. Capacity of the 4-in. Zipper belt is cited at 0.7 cu.ft. of material per foot of belt travel.

Plastic-Coated Tubing

American Brattice Cloth Corp., Warsaw, Ind., has announced the



Precisionbilt FOR LONGER SERVICE
J&L WIRE ROPE
PERMASET PRE-FORMED



Comparison with the service life of other ropes shows that it pays to standardize on J&L Precisionbilt Wire Rope. It consistently handles loads

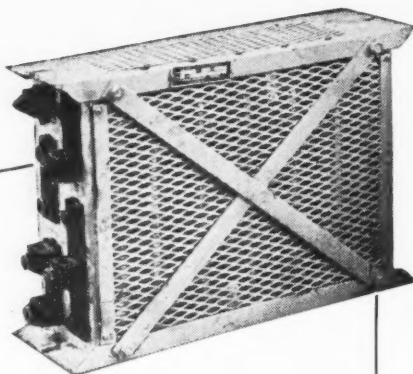
longer with safety—helps reduce maintenance costs. Specify J&L Precisionbilt Wire Rope for all your installations and equipment.

JONES & LAUGHLIN STEEL CORPORATION
GILMORE WIRE ROPE DIVISION

PITTSBURGH 30, PENNSYLVANIA

J&L *Precisionbilt* PERMASET PRE-FORMED WIRE ROPE

An external frame, supporting the helical coils in G. M. C. Resistances prevents damage due to jolts and vibration . . . thus insuring longer useful life. Added protection includes a shield to protect coils from outside injury. The coils are highly resistant to damage from mine water and mill fumes. Insulators are of a type not affected by sudden changes in temperature. For a really sturdy resistance unit, choose G. M. C.!



Protected Construction
lets G. M. C. Resistances
do a better job, longer!

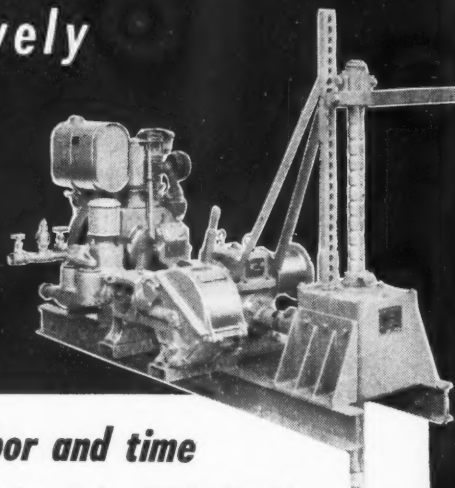
Guyana Machinery Company
Logan, West Virginia

for instance **STRIP MINING**
in

Know Positively

**DEPTH of
overburden**

**THICKNESS
and quality
of
COAL SEAM**



for least cost, labor and time

Light weight, simple operation, Acker Drills furnish complete subsurface information, accurate cores, from 300 ft. maximum depths. No feed screws or feed gears. Sturdy. Few parts . . . ideal for work in isolated locations. Easy to move over rough terrain; choice of mountings—truck, trailer or drag. Operate diamond, alloy or steel shot bits. Send for fully descriptive circular.

MODEL
LD

ACKER DRILL CO.,

SCRANTON 3, PA.

ACKER

**ROTARY
CORE DRILLS**

adaptation of vinyl plastics as a coating for its "MineVent Tubing" to secure a highly permanent protection against wear, weather, underground conditions and other destructive elements. Bulletin No. 107, available from the company, explains why vinyl-plastic-coated MineVent tubing is flameproof; highly resistant to wear, especially puncturing and abrasion; mildew-proof and impervious to moisture and water. Reportedly lighter in weight, it is said to be easier to handle in storage, installation and removal.

This new tubing is available in two grades: No. 14, with a heavy quality jute fabric base, and No. 15, which has a strong cotton-duck base and is recommended for severe acid or heat conditions and for permanent installations.

Conveyor Belting

Nylon now being used in its Cord conveyor belt to construct the patented transverse cord breaker, is said to be one of the most vital factors in the ability of the belt to withstand excessive gouging, heavy loading and extremely severe service, according to The B. F. Goodrich Co., Akron, Ohio.

Among principal advantages of nylon in this service, the company states, is the higher tensile strength of the cord compared to cotton, at least 55 percent stronger, according to tests. The nylon cord is less than half as thick as the cotton, permitting a great increase in the thickness of the shock-absorbing rubber cushion on both top and bottom of the transverse breaker. The nylon cord also has more than twice the stretch and recovery of cotton before the breaking point, which is said to give the new breaker and the belt itself greater resistance to severe impact at the conveyor-loading points. Nylon cord will not mildew or rot from dampness or moisture, it is said, and in case of a cut in the belt during operations, it is not affected by weak acids or alkalis. Good resistance to heat makes it particularly valuable for use in belts that convey hot materials.

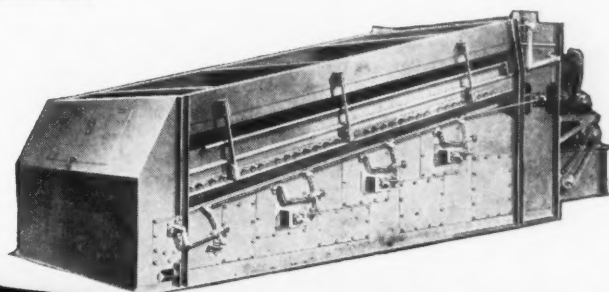
Diesel-Engine Parts

A new and complete line of 31 service-parts kits, designed for use in overhauls of Cummins diesel engines, has been introduced by Cummins Engine Co., Inc., Columbus, Ind. Each of the 31 kits in the new series contains all the genuine Cummins parts needed to overhaul a specific sub-assembly unit, conveniently packaged and easily stored. They will help engine owners complete their overhauls easier and faster and provide important savings on each overhaul, according to the manufacturer. Kit prices, it was pointed out, are considerably less than the cost of the parts purchased individually.

SMART OPERATORS PREPARE THEIR COAL WITH MODERN EQUIPMENT

Run of mine coal can be broken down into several grades of marketable finished product—and it is a smart producer who extracts all possible grades from his mine output.

Proper coal cleaning
is the answer.



R&S SUPER-AIRFLOW *is New*

Ideal for dry cleaning
coal smaller than
ten mesh!

In combination
with the Hydro-Separator and
Hydrotator Processes, two other
outstanding Roberts & Schaefer
achievements, this process offers
complete profit realization. Consult
Roberts & Schaefer—coal cleaning
specialists for over forty years.

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NEW LIFE FOR OLD CABLES

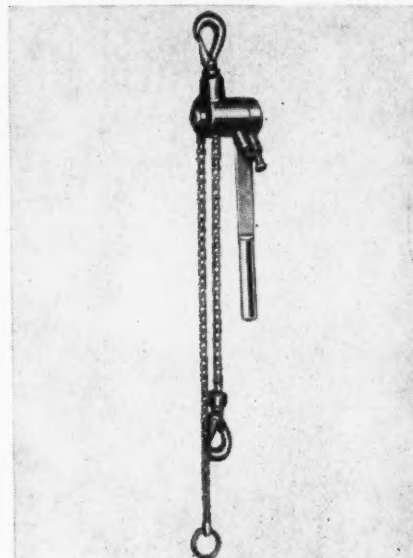
7 Point Superiority



- 1 Double grip . . . both sides adhesive.
- 2 Great tensile strength . . . tough.
- 3 Won't tear, ravel or pucker.
- 4 Resists abrasion.
- 5 Acid- and alkali-proof.
- 6 Extra thick . . . one layer insulates.
- 7 Exceeds A.S.T.M. specifications by 300% in adhesiveness, 26% in tensile strength, 290% in dielectric strength.

RUBEROID INSULATING TAPE

The RUBEROID Co., Executive Offices, 500 Fifth Avenue, New York 18, N. Y.



Puller

The Coffing Hoist Co., Danville, Ill., offers the new "Mighty Midget" puller, designed to pull or lift 500 lb. easily in spite of its highly portable, handy size. While the unit has a rated capacity of 500 lb., its chain has a tensile yield of 2,000 lb. and its snap hooks 3,000 lb. As an added safety factor, it has a "safety load" handle designed to bend at about 800 lb., which is said to be well below the yielding point of any other part. Weighing only 6½ lb. with chain, the midget puller features a two-way handle that can be used as a high-speed crank or a ratchet lever. The midget puller requires only 28 lb. of effort to produce a 500-lb. pull and is so compact that with the chain coiled up it fits neatly into a small tool box, the company states.

Memo to
MINE OWNERS...

Our effective Compensation Insurance, backed up by an Expert Technical Service, can aid you in improving production methods and safety practices while reducing insurance rates, accidents, litigation and lost man hours.

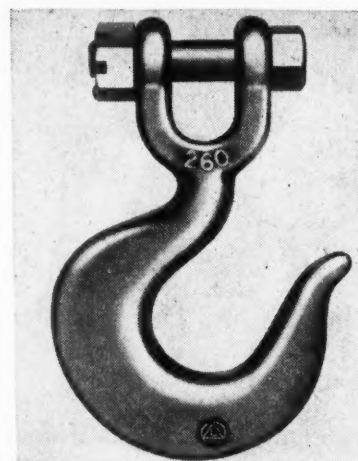
Specialists in
WORKMEN'S
COMPENSATION
and
PUBLIC LIABILITY
(Automobile
Excepted)

COAL OPERATORS
CASUALTY COMPANY

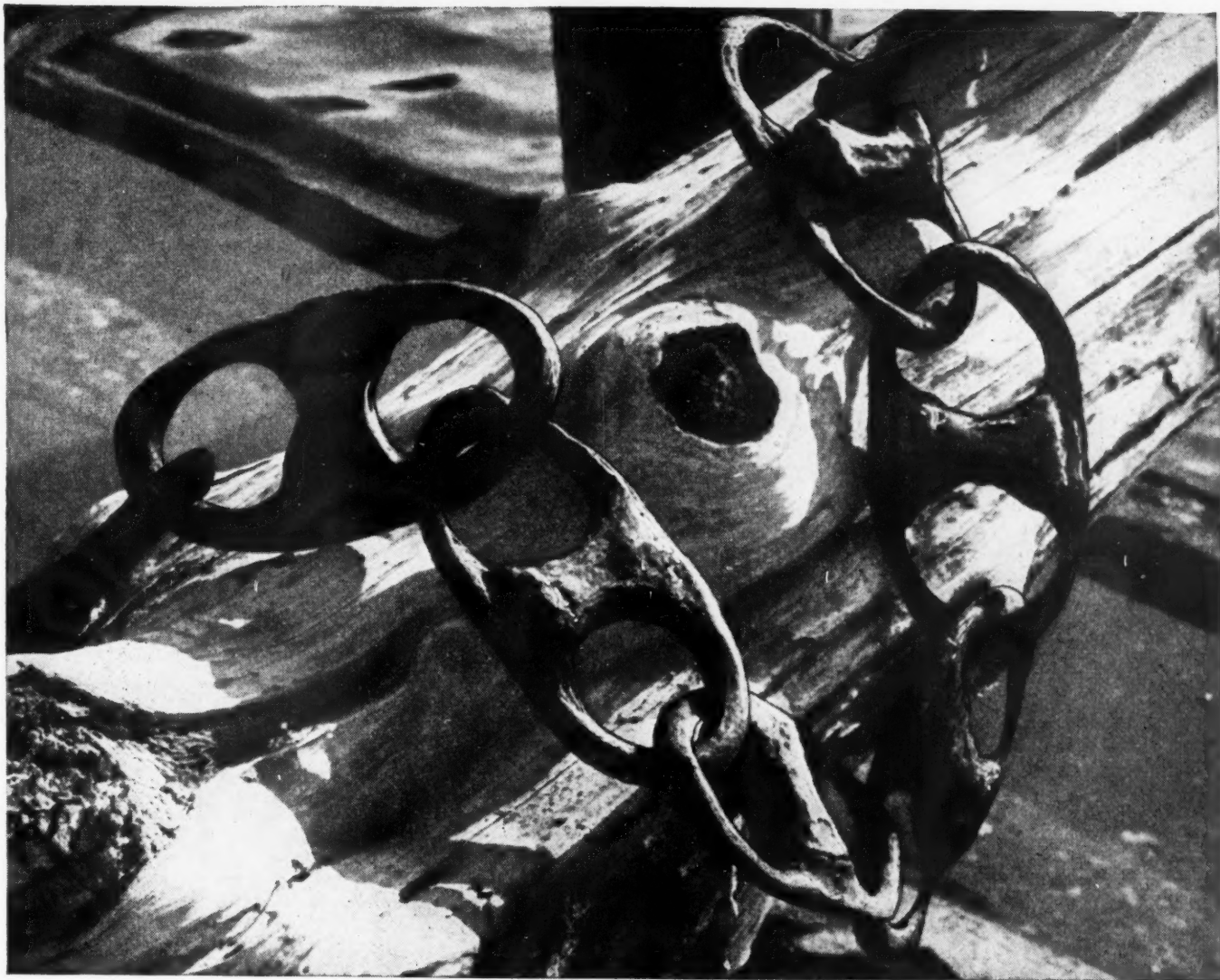
GREENSBURG, PENNSYLVANIA



THE SYMBOL OF SERVICE
FOR COMMERCE AND INDUSTRY



CLEVIS HOOK, announced by The Thomas Laughlin Co., Portland 6, Me., utilizing a bolt, slotted nut and cotter pin for fastening, is said to make it easy to attach the hook and switch from one job to another without welding, machining or threading. It is made in four sizes, 1½, 2, 3, and 5 tons and all parts are of drop-forged heat-treated steel.



CHAIN REACTION

VERY OFTEN a single industrial lubrication problem in your plant, if allowed to run unchecked, can set off a whole chain of costly production hold-ups.

Rust or corrosion, for example, frequently unnoticed in its insidious early stages, may soon affect a vital piece of equipment or machine. Then, suddenly, an entire production line is thrown out of balance.

Furnishing expert counsel and advice on rust and corrosion problems is only one of the many ways Cities Service lubrication engineers can help you. These cost-conscious, production-minded experts are "professional worriers." Their recommen-

dations for exactly the right grade of oils, greases, solvents or other petroleum products to meet your individual needs are based upon a sound, intelligent "situation analysis" made on the spot and backed by experience.

Moreover, behind the recommendations of a Cities Service lubrication engineer is the solid background of a company whose roots go back almost to the beginnings of the petroleum industry.

Why not let a Cities Service lubrication engineer do your "worrying" on all your industrial lubrication problems. Phone, wire or write Cities Service, Sixty Wall Tower, New York 5, N. Y. Room 28.

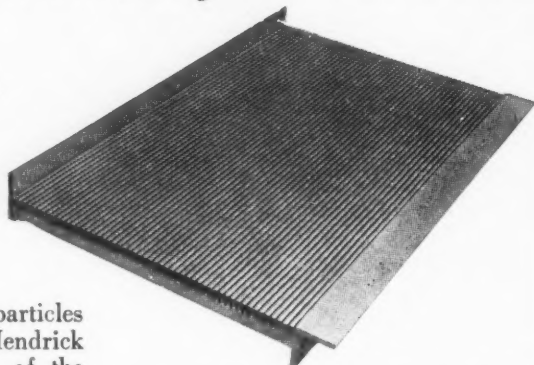


CITIES SERVICE Means GREAT Service

ALL THE WAY FROM THE REFINERY TO YOUR PLANT

Dewatering and Dryer Screens

with improved types
of Wedge-Slot
Profile Bars



Moisture and under-sized particles clear rapidly through the Hendrick Wedge-Slot Screen because of the uniquely designed profile bars, with openings enlarging downward. The accurately spaced slots extend uninterruptedly the entire length of the screen. To adapt them most effectively to the particular material to be

screened, Hendrick Wedge-Slot Screens are constructed with varied types of profile bars, in standard steel alloys, plain and abrasion-resisting steels, bronze, brass and duralumin. Write for full information.



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Perforated Metal Screens
Architectural Grilles
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Armorgrids

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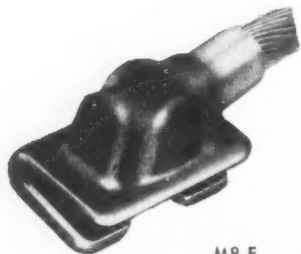
Sales Offices In Principal Cities



"Congratulations, Bill,
I notice power costs
are down this month"

"Thanks, Ed, but give
the credit to

MESCOWELD RAIL BONDS



M8-F
All-Purpose Bond

Mescoweld Rail Bonds are Flashwelded by a patented process which securely attaches bond to cable with a more oxygen-free weld. This assures maximum conductivity and long life and reduces costly power "leaks." Mescoweld Rail Bonds give you more for your power dollar. 18 types are available for immediate delivery.

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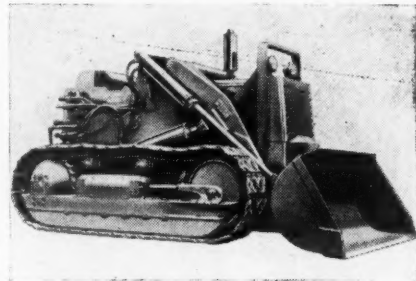
1115 ARLINGTON AVE. PITTSBURGH 3, PA.

Phone: HEmlock 8332

Bulldozer-Shovel

A new 2-yd. bulldozer-shovel has just been announced by the Frank G. Hough Co., Libertyville, Ill. Designed into the International TD-14 diesel tractor, the Model 14 bulldozer-shovel is said to incorporate many new exclusive features.

A large-capacity, front-mounted hydraulic pump, directly connected to the engine crankshaft, supplies power for all operations. With a single lever the operator can raise, lower, hold or "float" the bucket, or apply down pressure when hard digging is en-



countered. In addition, the bucket may be dumped partially or completely at any height and returned by hydraulic power, it is said. An automatic bucket "Tip-Back" tilts the bucket back 38 deg. in the carrying position to prevent spillage. Front-end superstructures are entirely eliminated, providing the operator with complete visibility in every direction. The bucket extends the full track width of the tractor to permit excavation close to walls, embankments and slopes. A full track-width bulldozer blade can be attached in a matter of minutes.

Carbon-Monoxide Tester

The M.S.A. Carbon Monoxide Tester, utilizing indicator tubes developed by the National Bureau of Standards and designed to determine the presence of carbon-monoxide concentrations in air, employs the most advanced colorimetric method of CO detection, according to the manufacturer, Mine Safety Appliances Co., Pittsburgh 8, Pa.

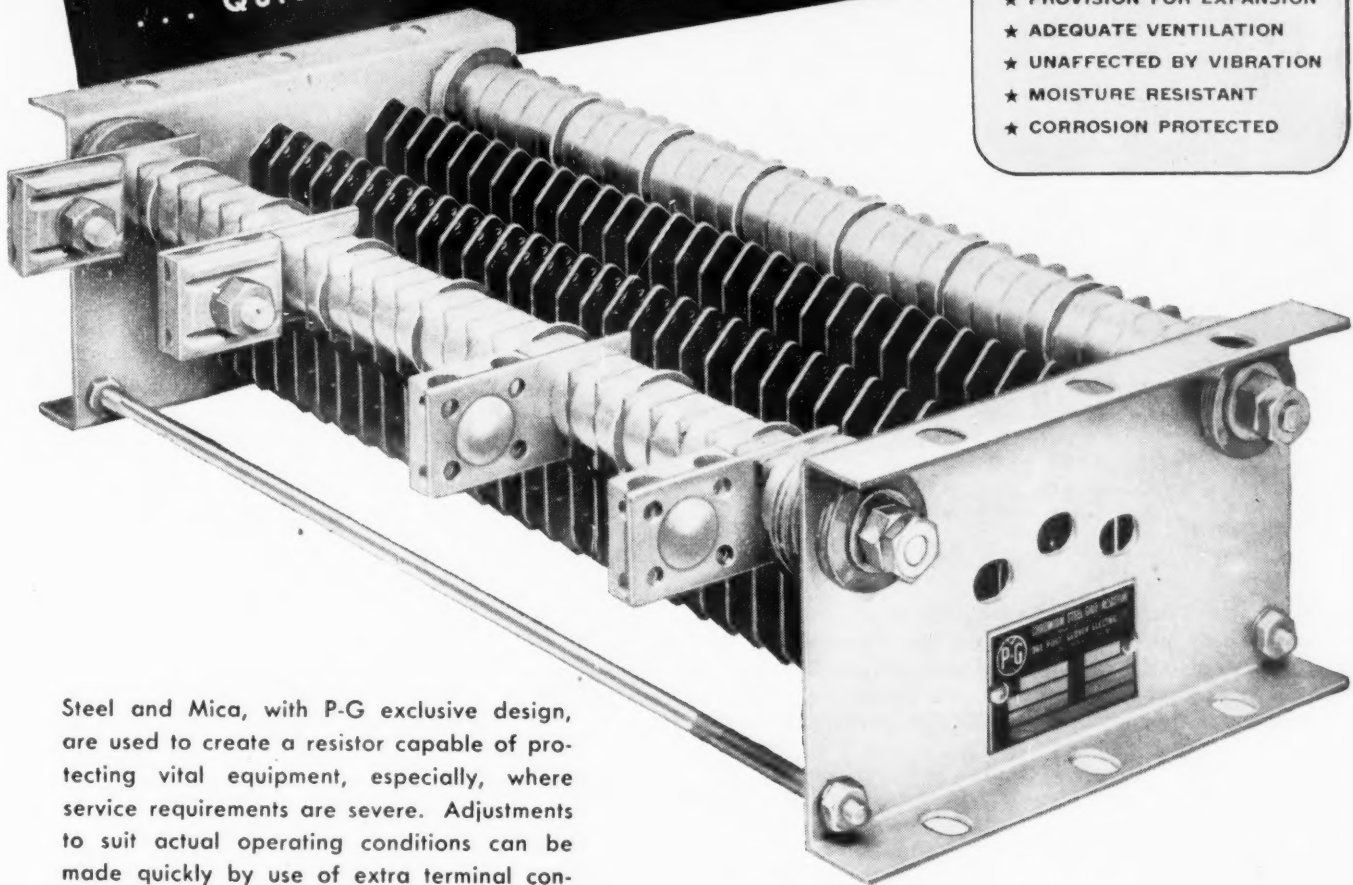
Said to be simple in operation and requiring no special training, the M.S.A. unit is reportedly capable of indicating the presence of carbon monoxide from 0.001 to 0.10 percent by volume in air. In use, the sealed ends of the detector tube are broken in a convenient tube-breaker and the tube inserted into the instrument tube-holder. If the sample of air aspirated through the tube by squeezing the bulb of the instrument contains carbon monoxide, the yellow indicating chemical turns varying shades of green, directly proportional to the CO concentration. Comparison of the discoloration with the instrument's integral revolving color scale is said to make for a quick and easy reading.

P-G STEEL GRID Resistors...

for HEAVY DUTY APPLICATIONS:

- ... Built for severe service conditions
- ... Protect vital electrical equipment
- ... Constant "Trouble Free" performance
- ... Quick adjustments easily made

- ★ ALL STEEL CONSTRUCTION
- ★ MICA INSULATION
- ★ RUGGED TERMINALS
- ★ PROVISION FOR EXPANSION
- ★ ADEQUATE VENTILATION
- ★ UNAFFECTED BY VIBRATION
- ★ MOISTURE RESISTANT
- ★ CORROSION PROTECTED



Steel and Mica, with P-G exclusive design, are used to create a resistor capable of protecting vital equipment, especially, where service requirements are severe. Adjustments to suit actual operating conditions can be made quickly by use of extra terminal connections* usually available. Try P-G Resistors for constant "Trouble Free" performance.

Steel Grid Resistors for COAL MINES Since 1915



The Nonbreakable Steel Grid Resistor

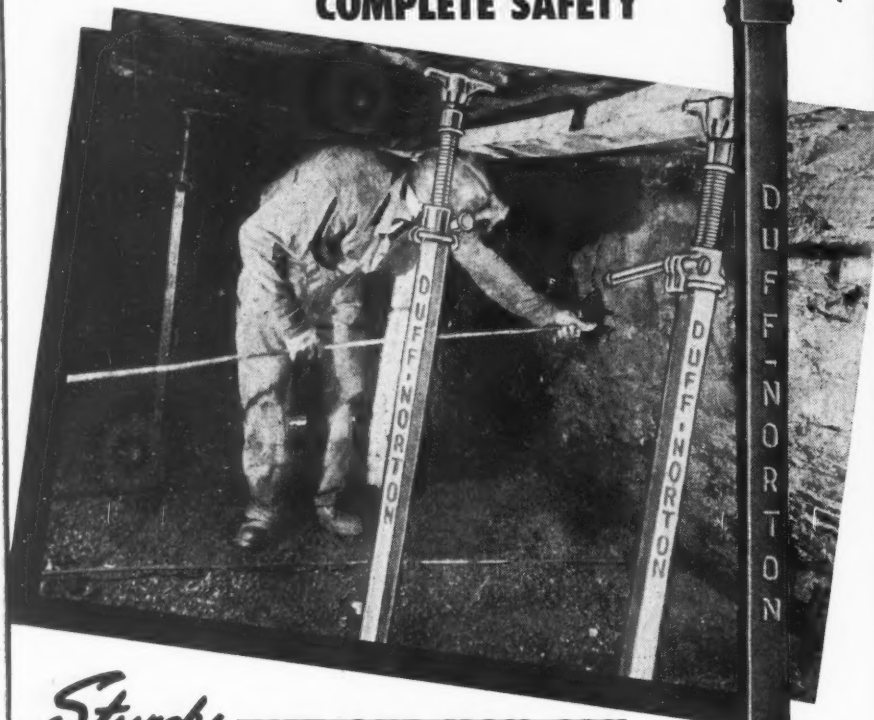
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DUFF-NORTON *Quick Operating* MINE ROOF JACKS

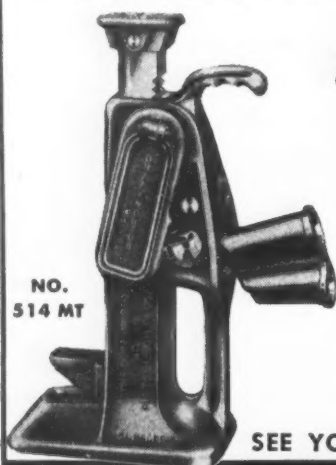
INSURE FULL CAPACITY WITH
COMPLETE SAFETY



Sturdy - YET ONE MAN CAN
HANDLE THEM

Duff-Norton Mine Roof Jacks are designed and constructed for safe, easy and quick operation. These dependable jacks serve as sturdy supports until permanent timbering is in place. Available in 8 and 16 ton capacities, with minimum and maximum heights ranging from 30" to 89". Write today for data.

NO. MR-16



NO.
514 MT

Automatic Lowering
**JACKS...for fast rerailling
of cars and other lifting jobs**

This Duff-Norton 5-ton Automatic Lowering Jack speeds up rerailling of mine locomotives and cars, bracing cutting and loading machines, mine track maintenance and general shop repair work. Write for catalog and data on this and other dependable Duff-Norton Jacks for every lifting and lowering application.

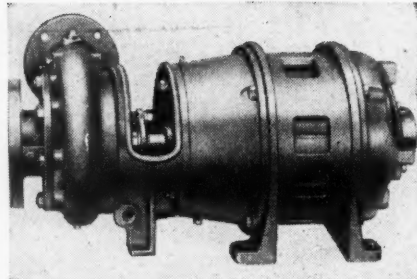
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"The House that Jacks Built" · PITTSBURGH 30, PA.

THE WORLD'S OLDEST AND LARGEST MANUFACTURER OF LIFTING JACKS



Pumps

Goulds Pumps Inc., Seneca Falls, N. Y., has announced a new line of "Close-Cupld" centrifugal pumps. Pump and motor are combined in a single, compact assembly ready to install and operate in any position except vertically with motor below pump. A single shaft eliminates a coupling to assure perfect and maintained alignment with freedom from vibration, the company says. One feature is a machined stuffing box, which permits use of either a die-formed, semi-metallic packing with lantern-type liquid seal ring or a mechanical seal. The use of semi-metallic packing is said to do much to minimize leakage.

The new "Close-Cupld" pumps are said to be designed for almost any service and are available in 17 sizes, with capacities up to 2,000 g.p.m. and heads up to 400 ft., depending on capacities.

Arc Welders

The Harnischfeger Corp., Milwaukee, Wis., has announced a complete new line of a.c. arc welders. Among features noted by the manufacturer is P&H "Dial-lectric" control, said to eliminate the need for moving coils or cores, worm gears, sprockets and chain or lever adjustments. Current selection is made simply by turning a single dial that requires only a three-quarter turn to cover the full welding range. P&H "Dial-lectric" design also eliminates the need for added or auxiliary current boosters.

All industrial models of this new P&H series are designed for remote control, made possible, it is said, by a removable control dial, and providing a current amperage adjustment at the job for manual or automatic welding. The high-low welding range is indicated on the "Dial-lectric" control dial by two separate ranges. The units are offered in intermittent industrial and heavy-duty models up to 625 amp.

Metallizing Gun

A new-type metallizing gun powered by an electric motor, and called the Moguletric Metal Spray Gun, has been announced by the Metallizing Co. of America, 1330 W. Congress St., Chicago 7. Designed for produc-

TO MODERNIZE A

Mental Picture

● The public—your public—has a tendency to picture American coal mining as it was many years ago. They do not realize how fully coal mining here has kept step with other progressive American industries.

That's why Bituminous Coal Institute's advertising so often dramatizes modern mining methods... repeatedly tells how huge private investment and skillful management have made American bituminous coal mines by far the most productive in the world.

To help bring other businessmen and the general public up to the minute in their ideas about your industry, Bituminous Coal Institute advertisements like the one above appear regularly in *Time*, *Newsweek*, *Business Week*, *Iron Age*, and *Pathfinder*. And this is only part of the big job being done in

COAL MINING, TOO, HAS "GONE MODERN"



Most of the work of mining America's coal used to be done by broad backs and bulging muscles. Nowadays, much of it is done by machine.

The timbering machine shown above, for instance, hoists and positions the heavy ceiling beams used in timbering the roofs of the modern coal mine. And this is but one of many types of coal-mine equipment... such as power drills, cutters, loaders, conveyors... now used to lessen the manual labor—and to increase the per-man production—of the American bituminous coal miner.

Today, more than 90% of all bituminous coal mined underground is mechanically cut... more than 50% is mechanically loaded... only about 5% is mined by pick and shovel!

Thanks to huge investments in mechanized equipment, to skilled management and to keen competition in the industry, America's bituminous coal mines are the most productive—and pay the best wages—in the world. They are able not only to meet this country's stupendous needs for coal, but also to help rebuild the war-shattered economies of other nations.

LIVING CONDITIONS of coal miners are keeping pace with improvements in their working conditions.

Today, about two-thirds—over 280,000—of the nation's bituminous coal miners either own their own homes or rent from private landlords. And among the remaining third, who now rent from their companies, there is a growing trend to buy the houses they live in.

Home-ownership among miners is increasing—due in no small measure to encouragement and financial aid from mine owners who realize that a man becomes a better worker and a better citizen as he develops pride in "a home of his own."

BITUMINOUS COAL
BITUMINOUS COAL INSTITUTE
A Department of
NATIONAL COAL ASSOCIATION
WASHINGTON, D. C.

BITUMINOUS COAL... LIGHTS THE WAY... FUELS THE FIRES... POWERS THE PROGRESS OF AMERICA

many ways and on many fronts. Now going into its fifth year of increasingly effective operation, the broad program of Bituminous Coal Institute merits the full support of every forward-looking bituminous coal operator.

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WASHINGTON, D. C.

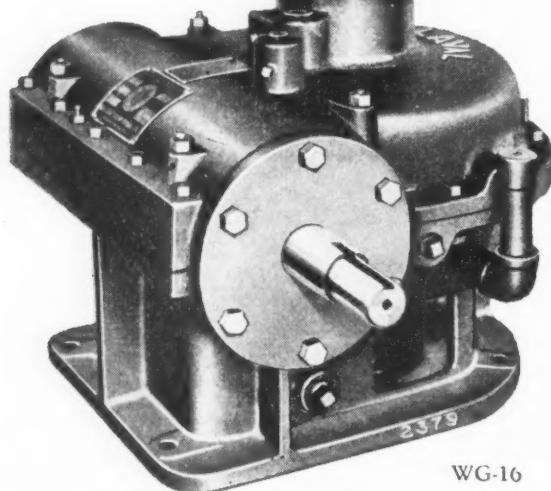
BITUMINOUS COAL... LIGHTS THE WAY... FUELS THE FIRES... POWERS THE PROGRESS OF AMERICA

DE LAVAL VERTICAL DRIVE REDUCERS

A complete line of De Laval vertical speed reducers, in both single and double reductions, is available for driving agitators, mixers, and many other types of vertical shaft equipment.

If vertical drives are your problem, consult De Laval.

*This single reduction De Laval Worm Gear Reducer is available with many standard gear ratios and is but one of the 93 sizes and types of standard De Laval Worm Gear Speed Reducers.



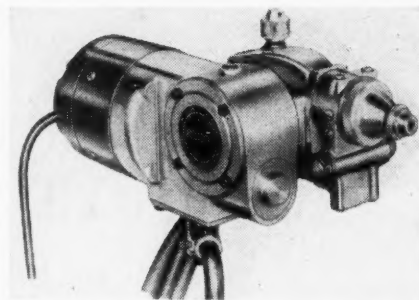
*
ONE
OF
93

Worm Gear Division

DE LAVAL

De Laval Steam Turbine Co., Trenton 2, N. J.

TURBINES • HELICAL GEARS • WORM GEAR SPEED REDUCERS • CENTRIFUGAL PUMPS
CENTRIFUGAL BLOWERS AND COMPRESSORS • IMO OIL PUMPS



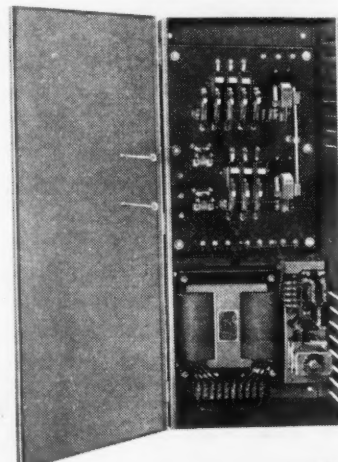
tion-line or other metal spraying where top speeds are essential, the unit, by using different combinations of gearing, can provide almost any spraying speed, and, through use of an electric drive, air requirements are materially reduced and turbine adjustments are eliminated, the company says.

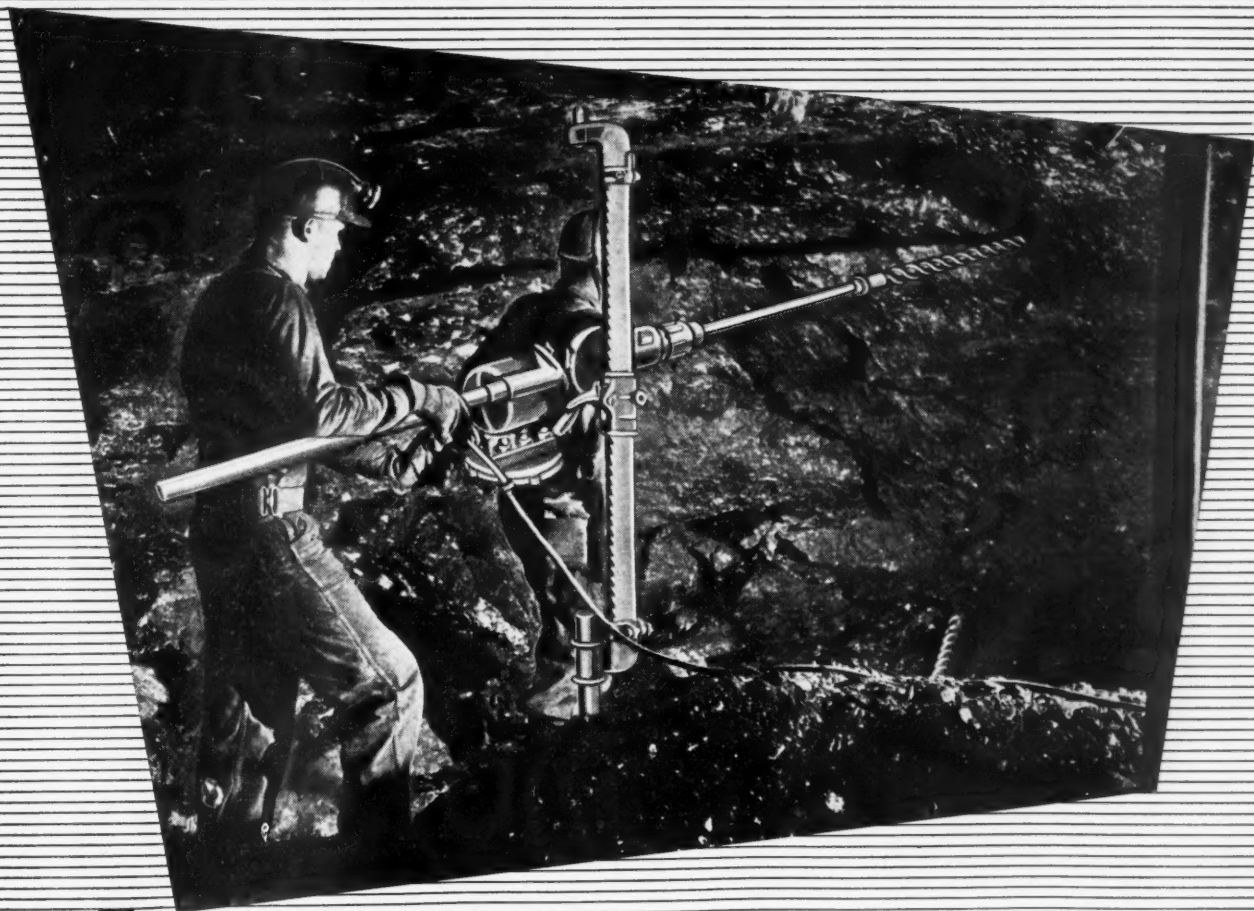
The unit is powered with a 1/20-h.p. constant-speed induction motor, thereby assuring a uniform wire speed and eliminating nozzle damage due to incorrect turbine adjustment. The gun can spray horizontally, vertically, up or down, or at any angle. Operation is extremely simple, according to the manufacturer, and the only adjustments are for gases and air. The unit is available in 25, 50 and 60 cycles.

Motor Starter

Ward Leonard Electric Co., Mt. Vernon, N. Y., has announced its new Bulletin 4051 A.C. automatic motor starter. The non-reversing auto-transformer-type units are said to be designed for use with single-speed two- or three-phase squirrel-cage induction motors driving pumps, fans, m.g. sets, compressors and other equipment and are advantageously used where inrush starting currents must be reduced or where motor-starting torque requires adjustment.

The dripproof inclosed starter is compactly and conveniently arranged in three removable sections: contactor panel, timer panel and multi-tap auto-transformer, providing complete accessibility to individual components, the company reports. For ease and simplification of installation, all line,





80 to 100 seven-foot 2½" holes per seven-hour shift

In the mechanized mine of Standard Coal, Inc., Standardville, Utah, drilling is done with CP-574 Permissible Post-Mounted Electric Coal Drills. Although the coal is very hard and tough, a CP drill averages 8 to 10 places — 80 to 100 seven-foot holes, 2½" in diameter — per seven-hour shift.

The rugged motor of the CP-574 complies

with all requirements of the U. S. Bureau of Mines, and carries the Bureau's permissible name plate.

Whatever your drilling conditions, you can obtain a CP Electric Drill exactly suited to them, since Chicago Pneumatic makes the world's largest line of electric coal drills.

Write for complete information.



**CHICAGO PNEUMATIC
TOOL COMPANY**

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LISTINGS**

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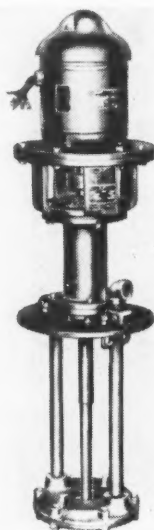
**FOR THE
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load and control terminals are completely accessible. Adjustable time-limit acceleration, overload protection, mechanical and interlock protection and adjustable taps on the autotransformer are provided on all starters. Said to be suitable for two-wire (low-voltage release) or three-wire (low-voltage protection) control, Bulletin 4051 A.C. automatic motor starters are available in standard sizes for use with squirrel-cage induction motors up to and including 100 hp., 550 volts, 60 cycles.



Pumps

For pumping operations requiring a simple, wet-pit-type pump in which use of submerged bearings is not permitted, Nagle Pumps, Chicago Heights, Ill., has developed the Type "SW-O" overhead bearing pump for handling abrasive and corrosive liquids and mixtures. With the anti-friction bearings supported in a pedestal attached to the floor plate, the shaft and bearings are said to be well designed for the heaviest loads apt to be imposed on them and are individually lubricated, usually with grease. The pump can be belt- or motor-driven. Type SW-O is recommended for heavy liquids, hot liquids up to 1,000 deg. F. or liquids containing

solids, according to the manufacturer.

A variation of the SW-O design, designated as the Type SW-OB pump has also been developed by Nagle Pumps, designed with the entrance from the bottom for handling mixtures containing quick-settling solids, or for intermittent operation where the inverted impeller of the Type SW-O might become loaded with solids when stationary. No stuffing box is necessary, it is said.

Jackhammer

A new rock drill designated as the "J-10 Utility Jackhammer" has been announced by Ingersoll-Rand Co., 11 Broadway, New York 4. This new air-operated drill has been designed and built for general utility and plant maintenance work, according to the company, and its light weight and ease of handling are said to make it suitable for use on a ladder or scaffold and for overhead work.

The J-10 is said to have strong automatic rotation and use standard Jack-bits. By using adapters, star drills can be used to drill holes 1 1/2 in. and under, and by removing the rotation pawls or using round-shanked tools, it can also be used as a light paving breaker or for chiseling and channelling. Throttle control is said to permit the selection of the right kind of blow for any type of work or tool. Drills, chisels, gouges and moil points are a few of the classes of tools that may be used with the unit.



MORE HAULAGE FOR 20% LESS BATTERY CAPACITY

Oil-tight, non-leak transmission. Use regular auto oil; change every 6 months.



Extra-long journal springs assure better trackability. Large motor, to assure more horsepower per ton weight of locomotive. Can be equipped with hydraulic brake.

GREENSBURG "RANGER"

This locomotive being used for main line haulage at the Blacksmith Coal Company, Novinger, Missouri. This is a 4 1/2 ton locomotive, operating on 30" gauge track. This locomotive built from 3 1/2 to 10 tons — either single or double motor-drive — 16" to 56 1/2" track gauge.

All Greensburg Locomotives are CUSTOM-BUILT to your requirements

THE GREENSBURG MACHINE CO. 101 STANTON ST. GREENSBURG, PA.

*More HMS equipment installations
than any other company:*

your guarantee of efficient operation

Wemco HMS Thickeners

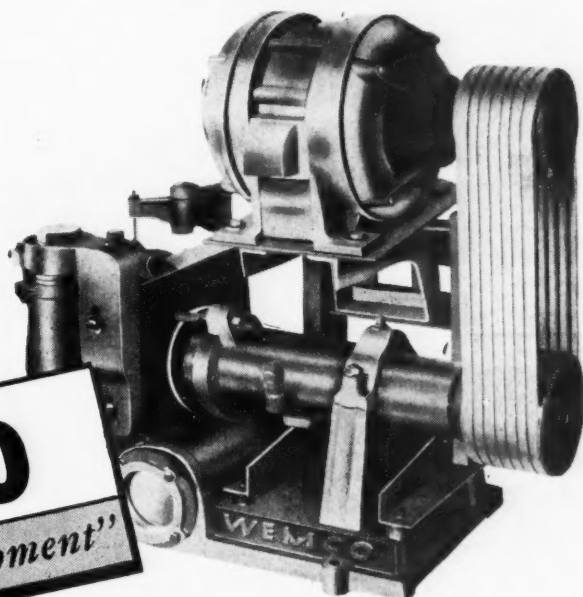
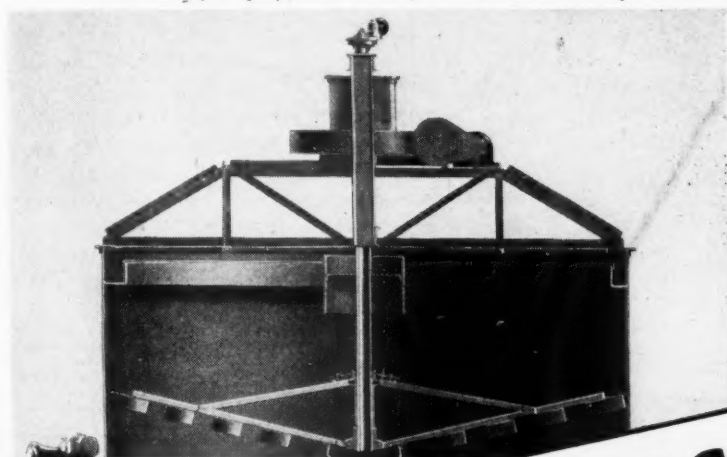
Employed primarily for recovery, dewatering and storage of the heavy medium. The lifting device is motorized for remote control by the operator from his operating position. The operator thus controls density of feed to the magnetic separators, without leaving his operating position. The heavy duty usage has demanded the development of operating mechanisms far more rugged than those usually employed on Thickeners for the standard practice.

When you use HMS for coal, metallic or non-metallic ore beneficiation, you can profit by Wemco's unequalled experience in equipping Heavy Media Separation plants. Wemco's record proves that all Wemco-equipped HMS plants have equalled or exceeded original production estimates.

Wemco experience speaks the operator's language . . . visualizes the operation of installations . . . provides for the small, but infinitely important refinements which make a plant efficient, durable and economical. In short, Wemco's wealth of experience guarantees the reliability of every installation.

Wemco HMS Sand Pumps

for severe operating conditions in handling pulps of coarse gritty solids, slimes, slurries or heavy-density media. Heavy wearing parts, true-balance shaft and over size bearings allow continuous operation under toughest conditions. Discharge diameters: 2" 3" 4" 5" 6" 8"



WEMCO
"Best in HMS equipment"

Wemco HMS Densifier

. . . Developed primarily for Heavy-Media Separation employing ferrous or magnetite media. After magnetic treatment, the media flows to the Densifier. The Densifier dewateres the media, stores it, and controls its rate of return to the Heavy-Media separatory vessel. Because this machine is the primary control of medium density in the separatory vessel, it is equipped with a variable speed drive and a motorized screw lifting device, both under control from the central operating position.



HMS equipment by Wemco:

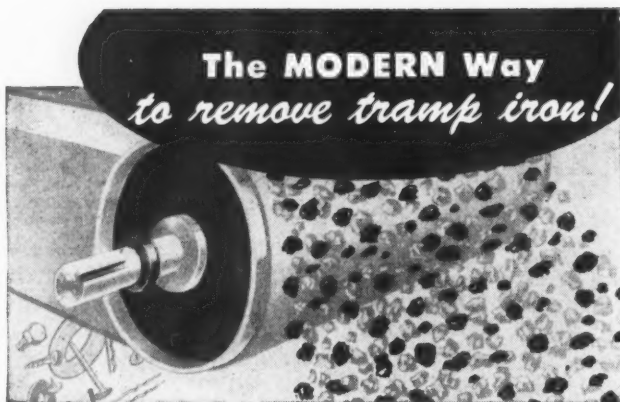
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DENSIFIERS . . . SPECIAL THICKENERS
SAND PUMPS . . . 20" HMS LABORATORY UNIT
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Here's the low cost, positive way to take iron out of materials carried on belt conveyors. No wiring . . . no electrical accessories . . . completely automatic . . . no maintenance or attention . . . tremendous magnetic strength. You can install it and forget it! Available in 53 sizes ready to install . . . Send for NEW BULLETIN 260-A.

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REMOVES IRON from foods,
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rock, ore, sand, scrap, slag,
cement, sugar, etc.

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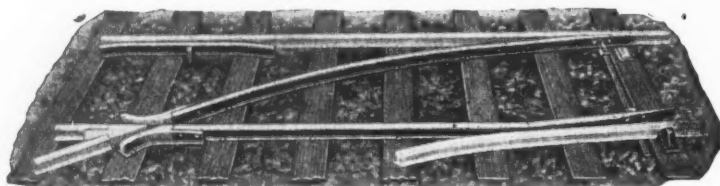
"HIGH
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MAGNETIC
PERMANENCE
GUARANTEED
FOR LIFE!

**KEEP More COAL ROLLING FASTER
with DEPENDABLE FROGS and SWITCHES**

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Titan Frog, Long Arm Turnout



The Titan Frog is furnished in Titanium or Manganese treated steel. In combination with the proper switches, stands, etc., it is easily installed; used right or left hand; saves joint bars.

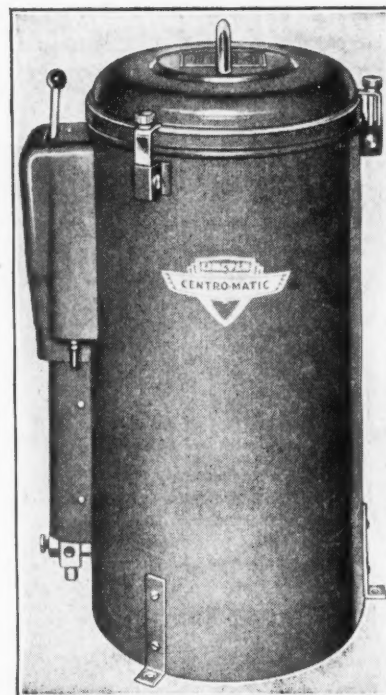
Weir products for mine track work include a wide variety of constructions in frogs, switches, guard rails, clamps, stands, etc.



CATALOG "H" comprises 154 pages of helpful data, replete with photos, drawings and specifications, covers every track work need. A request on your letterhead will bring your copy promptly.

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LUBRICANT PUMP—Model 1825 Lincoln
Centro-Matic Lubrigun announced by Lincoln Engineering Co., St. Louis 20, is an automatic, air-motor-powered unit that may be operated to cycle the Centro-Matic System at pre-determined intervals. Container capacity, 60 lb. of lubricant; pressure ratio, 70 to 1.

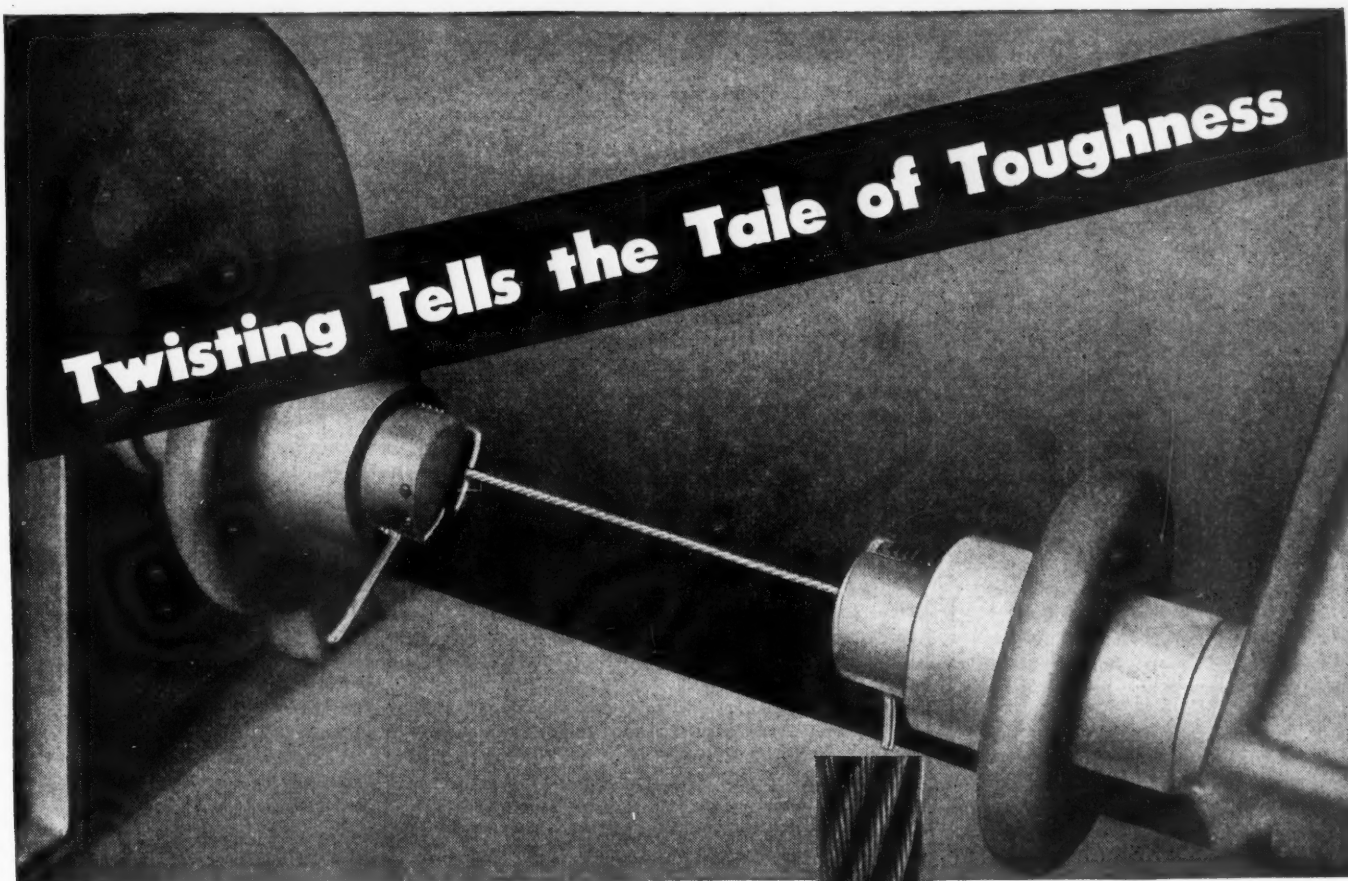
Electric Hoist

Wright Hoist Division, American Chain & Cable Co., Inc., York, Pa., has announced a new line of Speedway electric hoists presently available in capacities of 250 to 2,000 lb. Among the features of the line, as reported by the manufacturer, are: a grooved drum that accommodates a full 12-in. lift with no overwinding; pushbutton control; preformed wire rope with swaged fittings for anchoring; Timken tapered-roller-bearing trolleys that reduce effort in moving loads along runway beams; standard NEA motor frames and ratings. The hoist is furnished with lug, hook or trolley suspension as required. All trolley hoists are equipped with a special pull chain and handle for moving the hoist along runway beams, thus eliminating the necessity for pushing directly on the load.

Trade Literature

Available Without Charge on
Request to the Manufacturer

Truck Tires—The B. F. Goodrich Co., Akron, Ohio. Truck Operators' Handbook, designed to assist truck operators in reducing operating costs by proper selection and maintenance of tires, discusses factors that can be controlled to get the most service out of any truck tire, such as proper air pres-



Here we see an 8" piece of rope wire being twisted on its own axis. The revolutions necessary to break the wire are counted and only those coils are accepted which test at least 10% above American Petroleum Institute specifications for wire rope. In addition to being an indication for toughness, the torsion test reveals whether the wire is free from steel defects such as seams and cups.

A routine test? Yes, but with higher standards. And every coil of wire on both ends must pass this and countless other tough tests before acceptance for use in making Wickwire Rope. It's these tests, coupled with over 125 years of wire-working know-how, that are your assurance of the utmost in performance, safety and long rope life when you use Wickwire Rope.

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Thousands of wire rope users have found that the information packed in the pages of "Know Your Ropes" has made their work easier. It's full of suggestions on proper selection, application and usage of wire rope. It's easy-to-read and profusely illustrated. For your free copy, write — Wire Rope Sales Office, Wickwire Spencer Steel, Palmer, Mass.



WICKWIRE ROPE

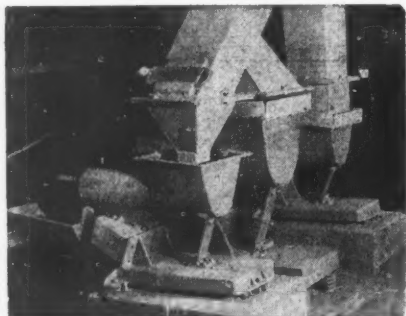
A PRODUCT OF THE WICKWIRE SPENCER STEEL DIVISION OF THE COLORADO FUEL AND IRON CORPORATION

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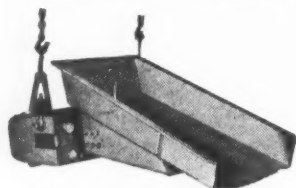




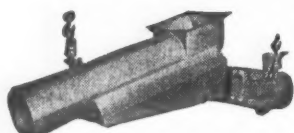
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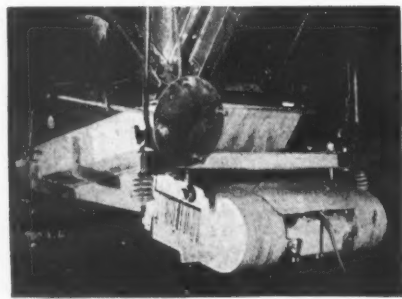
**Provide the Easy,
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—in preparation plants, to
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Variable control of rate of feed.

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tures, overloading and improper load distribution, speeds and their effects on tire life, matching and spacing of duals and mechanical irregularities. Ninety-three factors that affect truck-tire life are listed, along with data on each type of truck tire the company manufactures.

Wire and Cable—Simplex Wire & Cable Co., 79 Sidney St., Cambridge 39, Mass. General Catalog provides a brief, non-technical description of properties and features of various Simplex wire and cable products and includes a "Selector" chart classifying the products available by type of use.

Conveyor Units—Link-Belt Co., 2410 West 18th St., Chicago 8. Book No. 2175, on Link-Belt Bulk-Flo conveyors contains engineering and operating data, charts, tables and formulas to determine the Bulk-Flo size and proper operating speed for a given handling capacity and weight of material.

Wire Cloth—Newark Wire Cloth Co., 351 Verona Ave., Newark 4, N. J. Bulletin covers the company's complete line of woven wire cloth, metallic filter cloth, metallic bolting cloth, fabricated wire parts, A.S.T.M. testing sieves and testing sieve shaker.

Electric-Welding Cable Connectors—Tweco Products Co., Wichita 1, Kan. Catalog describes the complete line of TWECO welding electrode holders, ground clamps, cable connectors, machine terminals, cable splicers, lugs and carbon holders and includes quantity price and parts information. New two-page bulletin entitled, "Causes and Cures for Hot-Running Welding Cables and Connections," also available, discusses, for easy understanding, the arc-welding process.

Pump—Byron Jackson Co., Pump Division, Los Angeles 54, Calif. Bulletin No. 47-8020 describes the Hydroplex pump, a split-case multi-stage centrifugal pump for low-capacity and high-pressure pumping. Construction and operation features, dimensions, capacities, etc., are included, along with cross-section and installation illustrations.

Floor Resurfacing—Stonhard Co., 403 North Broad St., Philadelphia 8. Folder describes Stonhard Resurfacer, a heavy-duty material for repairs and overlays on concrete and wood floors. Typical installations and characteristics of the material in solving floor problems in a number of industries are illustrated.

A. C. Generators—Electric Machinery Mfg. Co., 821 Second Ave., S. E., Minneapolis 14, Minn. Article, "How to Apply 'Packaged' A. C. Generators," with seven tables for generator and wire selection, is available in the company's publication, Synchronizer, Vol. 8, No. 3a. Another article, "Pre-engineered Generator Switchgear," contains diagrammatic index of use of company's products of this type.

Are Welders—The Hobart Bros. Co., Troy, Ohio. Catalog illustrates and describes, with dimensions and specifications, "Simplified" arc welders, which includes electric-motor-driven d.c. welders, gasoline-engine-driven welders, a.c. transformer-type welders, welding generators, gasoline-engine-driven welders with auxiliary a.c. or d.c. power generators, special models and arc-welding electrodes and accessories.

Ear Protector—Industrial Products Co., 2820 North Fourth St., Philadelphia 33. Folder describes the features and use of the Sepco ear protector that is said to reduce the amount of noise entering the ear and also provide protection against material entering the ear canal.

Inventory Financing—Lawrence Warehouse Co., 37 Drumm St., San Francisco 11, Calif. Booklet, "Borrowing on Inventory to Finance Your

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Continuous Slot Openings

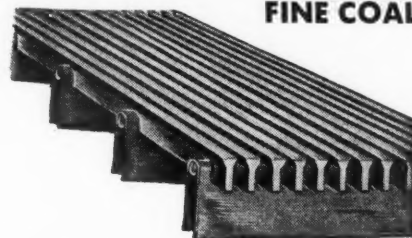
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**INCREASE
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LOWER
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IN SIZING AND DEWATERING

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WEDGE-BAR means continuous slots. No cross wires, loops or non-perforated areas. Downward enlarging slots draw moisture and undersize from screen surface. U-Holder supports mean maximum carrying capacity and rigidity.

WEDGE-BAR Sections are specially designed and fabricated to do your job and fit your equipment for the most efficient screen performance and longest life. Your inquiries are invited. Our engineering service can help you solve your screening problems.

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Shaker Jackets • Vibrating Screens
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Accidents-



Speak louder than words...

Underground mine timbers weakened by decay . . . a cave-in . . . tense, agonizing hours of waiting, mute praying . . . and then, the unmistakable finality as four bodies are brought to the surface. What good are words.

Yet, words could have helped prevent such an accident . . . words outlining a safety plan to be carried out by Bituminous Safety Engineers.

Bituminous Safety Engineers combine laboratory and field work in providing a complete safety program for Bituminous Workmen's Compensation policyholders. This program, which helps save lives and reduce the frequency and severity of accidents, includes regular mine inspections . . . analysis of mine hazards . . . survey result recommendations . . . accident prevention activities . . . reduction of operating expenses resulting from accidents . . . and establishment of production efficiency. Not only mine owners, but operators and workers as well benefit. They all learn the true meaning of the Bituminous slogan,

Security with Service

**BITUMINOUS CASUALTY
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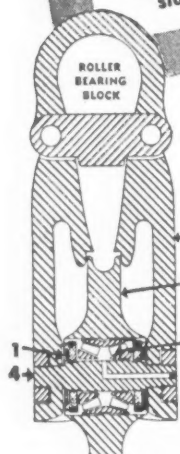
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OVER 30 YEARS OF SERVICE TO THE INDUSTRY

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**MORE and MORE
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SPECIFY
SKOOKUM
SLUSHER
BLOCKS**

1. SKOOKUM'S PATENTED BEARING ADJUSTMENT and locking device makes on-the-job maintenance easy, seals out moisture.
2. TIMKEN TAPERED roller bearings . . . free running, heavy duty, sealed against dirt and moisture.
3. MANGANESE STEEL SHEAVES . . . non-wearing . . . will not wear cables.
4. CENTER PIN . . . tempered, stress-tested steel.
5. ANNEALED CAST STEEL sides for extra strength.



More and more mine operators are learning that it costs less to use Skookum Slusher Blocks. Make a trial order of Skookum blocks. Test them. Compare them. You, too, will agree that Skookum is a better slusher block by at least 5 counts.



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Business," discusses general business financing with emphasis on inventory financing and explains how inventory can be used as collateral for working capital loans from a regular bank or other lending agency.

Laboratory Shaker—Burrell Technical Supply Co., 1942 Fifth Ave., Pittsburgh 19, Pa. Bulletin No. 207 describes the Burrell "Wrist-Action" shaker for the shaking of various laboratory flasks, vessels and bottles.

Hard-Facing—Metallizing Engineering Co., Inc., Long Island City, N. Y. Bulletin No. 53 explains the operation and features of the new Sprayweld method of hard-facing using a metalizing gun and Metco-Weld H, a "wire" composed of a powdered hard-facing alloy extruded with a plastic binder.

Surface Coating—Sika Chemical Corp., 35-49 Gregory Ave., Passaic, N. J. Pamphlets describe the application and properties of Sika Seal, a new protective coating for concrete masonry or steel surfaces said to have excellent adhesion to wet or dry surfaces and can be applied under water.

Powdered-Soap Dispenser—American Dispenser Co., Inc., 215 Fourth Ave., New York 3. Bulletin describes the new "Powdurn," a new powdered-soap dispenser said to have no mechanical agitators, avoid caking of powder and permit one-hand operation.

Acetylene Generator—Sight Feed Generator Co., Richmond, Ind. Bulletin describes and illustrates the operation of the new PS line of Sight Feed acetylene generators, said to feature lighter weight, greater portability and maximum safety.

A. C. Arc Welders—John A. Kern Co., 224 (52) North Loomis, Chicago 7. Bulletin No. 101 illustrates the features of the new Kern line of a.c. arc welders made in three industrial models of 200, 300 and 400 amps.

Truck Tire Maintenance—Rubber Mfg.'s Association, 444 Madison Ave., New York. Section of manual prepared by the association on cutting tire costs and getting extra mileage from heavy duty casings may be secured by users of off-the-road trucks, tractors and earth-moving equipment from their dealers. Factors contributing to unnecessary tire wear and premature failure, along with approved practices, are detailed for various classes of service.

Electrodes—The Hobart Bros. Co., Troy, Ohio. Electrode wall chart lists procedures for every type of arc-welding electrode, describes common faults and how to correct them.

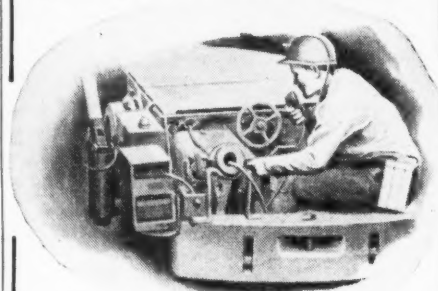
Industrial Notes

General Electric Co., Schenectady, N. Y., has elected Henry V. Erben a vice president of the company and general manager of its Apparatus Department, succeeding Roy C. Muir, who retired Dec. 31 after more than 42 years' service. John D. Lockton has been elected treasurer of the company, succeeding Jesse W. Lewis, who also retired Dec. 31, after more than 37 years' service. Mr. Erben was previously a commercial vice president and assistant general manager of the Apparatus Department, and Mr. Lockton was an assistant treasurer.

Chevrolet Motor Division, Detroit, has named as assistant general sales manager Ivan X. Sarvis, formerly

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**... talk between
dispatcher and
as many moving
or stationary
points as needed**

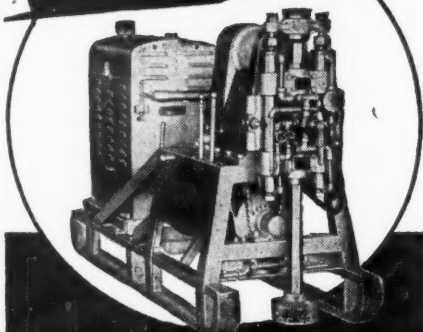


The FEMCO Trolley Phone saves time, saves money, promotes safety. Small compact design of equipment permits installation anywhere. Designed and engineered for heavy duty. All plug-in units for ease of service.

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Testing mineral properties with our light gasoline drills. **SATISFACTORY COAL CORES GUARANTEED.** Ground solidification by our pre-pressure grouting method for shafts. Wetmine areas, horizontal holes for drainage. Electric drills for inside mine drilling.

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Failure-Free
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SIX REASONS WHY ROCKBESTOS A.V.C. MEANS MORE TONNAGE AT LESS MAINTENANCE COST:

1. The impregnated asbestos yarn braid is heatproof, flameproof and resistant to moisture, oil, grease and alkalis.
2. The felted asbestos insulation beneath, impregnated with heat, flame and moisture resisting compounds like the braid, won't bake out, crack, flow or burn.
3. Asbestos-protected varnished cambric supplies high dielectric strength and added moisture resistance.
4. The inner impregnated asbestos insulating wall won't get brittle or crack under conductor-heating overloads and won't burn even if the copper melts.
5. The paper separator prevents the insulation from sticking to the conductor and makes stripping easy.
6. It is made to fit bushings properly.

*This construction is one of 125 developed by
Rockbestos for severe operating conditions.*



When you use Rockbestos A.V.C. for internal wiring of your equipment, you are insuring that cutters, loaders and locomotives will show a reduction in down-time, will work more consistently *on the job*.

You're promoting safety — Rockbestos A.V.C. won't ignite, burn or carry flame because of its fire-resistant asbestos insulation and braid.

This same insulation protects Rockbestos A.V.C. from drying out or cracking, from blooming or rotting when exposed to oil or grease . . . helps insure a long, trouble-free cable life.

Reduce your maintenance expense and take out more tonnage by specifying Rockbestos A.V.C. in new and rebuilt equipment. Use it for rewiring, too. Bulletin 30-C tells the story. Write for your copy today, and ask for a sample.

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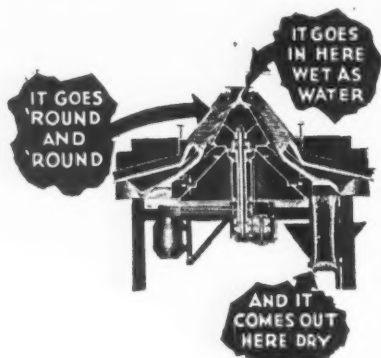
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CHARLESTON, W. VA.: Charleston Elec. Supply Co.	LOTHAIR, KY.: Mine Service Co.	WHEELING, W. VA.: Westinghouse Elec. Supply Co.
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FOR the most economical and simple method for dewatering and drying the smaller coal sizes. The many installations in modern coal washing plants are proof of this. We shall be glad to give you the details of the installations.



Sludge and slurry coals are also being reclaimed by using this machine. Where a large part of the ash is in the finest sizes, ash content as well as the water content is reduced.

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regional manager of the division's Southwest region and a veteran of more than 20 years in Chevrolet.

Mack Trucks, Inc., New York, has announced the retirement of C. W. Haseltine, associated with the company since 1912 and vice president, secretary and treasurer of the company, as well as director of Mack Mfg. Corp. F. W. Sommer has been named treasurer and T. V. Homan secretary of the company. Mr. Sommer and Mr. Homan, who were both previously assistant secretary and assistant treasurer, joined the organization in 1922 and 1912, respectively.

The Lincoln Electric Co., Cleveland, Ohio, has appointed G. E. Tenney service manager to direct the newly expanded service department. Mr. Tenney has been district manager at Lincoln's Chicago office for the last 15 years.

Philco Corp., Philadelphia, has named Thomas A. Kennally, formerly vice president in charge of sales, vice president and assistant to the president of Philco Corp., to assist in the over-all direction of the corporation's activities. James H. Carmine, formerly vice president in charge of merchandising, has been made vice president in charge of distribution and in this newly-created position will be responsible for all Philco sales, merchandising and advertising activities.

Hercules Powder Co., Wilmington, Del., has appointed L. C. LeBron assistant manager of its explosives department's contractors' division. Mr. LeBron has been associated with the company's sales and service organization since 1927.

DeLaval Steam Turbine Co., Trenton, N. J., has named J. P. Stewart manager of the newly combined commercial and marine sales divisions, succeeding H. V. Petersen, who has retired after 34 years' service. H. G. Bauer, manager of the marine division, has been appointed executive engineer of the company. J. W. Hertzler, manager of worm gear sales since 1924, has retired and is succeeded by W. A. Reynolds, who becomes manager of the combined IMO rotary pump and worm gear divisions. C. A. Jurgensen has been appointed acting works manager. W. A. Neumann Jr. has been named factory controller, assistant treasurer and assistant secretary.

Chain Belt Co., Milwaukee, has elected three vice presidents, as follows: L. B. McKnight, formerly executive assistant to the president and associated with the company since 1927, vice president with executive responsibility for the conveyor and process equipment and construction machinery division. O. W. Carpenter has been elected vice president in charge of finance and B. F. Devine, who started with Chain Belt in 1909, has been elected vice president and

FOR SAFETY'S SAKE, SUPERIOR COUPLINGS



Drop Forged Links

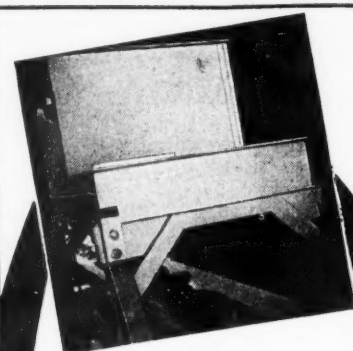
Drop forged for strength, Superior Swivel and Single Link Couplings are built to stand the gaff. No welds to let go with resulting wrecks. Superior Couplings on your mine cars will prevent accidents and reduce haulage costs. Order Superior Couplings for your replacements and specify them on new equipment.

DROP FORGED SWIVEL COUPLINGS



PITTSBURGH KNIFE & FORGE CO.

1421 Reedsdale St., N.S.
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MERRICK WEIGHTOMETER

While material is smoothly moving along a conveyor, the MERRICK WEIGHTOMETER keeps a continuous and accurate record of weights. Total weight is available at a glance. Applied to any size belt conveyor, either horizontal or inclined. The weightometer gives a simplified and dependable record of your production, without interrupting the flow of coal.

Write for Bulletin 375

**MERRICK
SCALE
MFG. CO.**

PASSAIC,
N. J.

AMERICAN

CONTINUOUS VACUUM FILTER

Loss of Fine Coal Stopped with this Filter — Economically!



What's the situation in your state now about allowing fine coal to pass down stream from the washery? Any legal restrictions? Fine coal's worth saving anyway and you can use over again the water which the filter recovers.

For this coal recovery job, we recommend the American Continuous Vacuum Filter which offers exceptionally high filtering capacity for floor and building space required. It's a low speed, automatic unit requiring little attention and maintenance. Several companies already have this filter with all reporting excellent results from the standpoint of both efficiency and economy.

Word to our nearest office about your fine coal losses will bring prompt attention.

OLIVER UNITED FILTERS INC.

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33 West 42nd Street

San Francisco 11
California

Chicago 1, Ill.
221 N. LaSalle Street

Western Sales Division
Oakland 1, California
2900 Glascock Street

*Sales & Manufacturing
Representatives:*
E. Long Limited
Orillia, Canada

Factories:
Oakland, Calif. • Hazleton, Pa.
Orillia, Canada
Melbourne, Australia

will continue his duties as manager of the construction machinery division.

Raybestos-Manhattan, Inc., Manhattan Rubber Division, Passaic, N. J., has appointed P. L. Edwards assistant manager of its central district office in Pittsburgh. Mr. Edwards, formerly manager of the products division of its western district office, has been associated with the company for 29 years.

Hewitt-Robins, Inc., New York, has organized a new division, Robins Engineers, to handle the contracting phases in the design, engineering and installation of complete materials handling and processing plants. The 50 engineers assigned to the new division formerly were associated

with the concern's Robins Conveyors division. Harold Von Thaden, who joined Robins Conveyors 25 years ago, heads the new division as vice president. Elmer C. Salzman, with the company for 36 years, will be vice president in charge of sales, and R. W. Eichenberger, with 38 years service, will be vice president in charge of the Midwest office in Chicago.

Le Roi Co., Milwaukee, has elected as president E. A. Longenecker, formerly president of the Lauson Division of Hart-Carter Co., succeeding C. W. Pendock, who has been named chairman of the board. Mr. Pendock has been the only president in the company's history. He sparked its growth from a small machine tool shop in 1914 to its present position in the field.

Wilson Welder & Metals Co., Inc., New York, a wholly owned subsidiary of the Air Reduction Co., Inc., has elected Thomas B. Hasler, formerly president, chairman of the board of directors, succeeding C. E. Adams, resigned. F. B. Adams Jr. has been elected president and a director. Mr. Hasler had been president of the company for 29 years and is a director of the Airco Export Corp. and Arcrods Corp. and vice president of G. D. Peters & Co. of Canada, Ltd. Mr. Adams also is director of apparatus research and production of Air Reduction Co., Inc.

Marion Power Shovel Co., Marion, Ohio, has leased the former Firestone rim plant in Cambridge, Ohio, from the Community Industrial Association, with the right to purchase it outright at a later date. It is expected that manufacturing operations will start early in 1948 and that 250 to 300 skilled workers ultimately will be employed at the plant, which has 110,000 sq. ft. under roof.

Joseph T. Ryerson & Son, Inc., has appointed Alfred J. Olson an assistant sales manager of its Chicago plant, succeeding Ray C. Page, recently named sales manager of the company's new steel-service plant under construction in the San Francisco area. Mr. Olson has been a member of the Ryerson organization since 1923, from 1936 as a sales representative in Illinois.

Screen Equipment Co., Inc., has opened a new factory and general office at 1750 Walden Ave., Buffalo, N. Y. The new factory has approximately 25,000 sq. ft. of floor space to be devoted entirely to manufacture of Seco vibrating screens, and with modern and expanded manufacturing facilities available, the company expects that deliveries will be made promptly in the future.

Allis-Chalmers, Milwaukee, has named William M. Wallace special assistant to G. V. Woody, manager of the Allis-Chalmers basic industries department. Mr. Wallace has served as a sales representative in the company's Denver and Pittsburgh district offices, and more recently as an engineer in the basic industries department.

Nelson L. Davis Co., Chicago, has announced that S. M. Parmley, formerly assistant chief engineer, Pittsburgh Coal Co., has joined its organization and will be connected with the construction of the new Jones & Laughlin preparation plant recently announced.

Hewitt Rubber Division, Hewitt-Robbins, Inc., Buffalo, N. Y., has appointed the Monarch Electric Co., LaSalle, Ill., a distributor. The company, which serves local industry within a radius of 75 miles, is a partnership owned by F. D. Rowlee and R. E. Waite.

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L. E. YOUNG

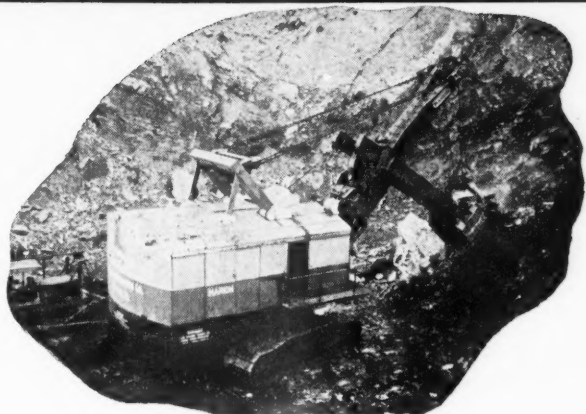
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Oliver Building—Pittsburgh, Pa.



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Marion representatives are at your service in helping you select the most profitable Marion for your operation.



MARION

POWER SHOVEL COMPANY

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Offices and Warehouses in all Principal Cities



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HORIZONTAL DRILL.
WITH TRACTION DRIVE**

**3000 LBS.
OF
MECHANICAL
DYNAMITE**

Ten years of field test has proven that our power-feed design of direct transmission and worm gearing with two-speed control will not only cut shot hole drilling time in half but also eliminates costly maintenance delays. V-belt drive to the power-feed with an additional ample clutch in that assembly gives absolute control of a drilling speed of two to three feet per minute with a retrieving speed of twenty-four feet per minute.

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**EFFICIENT STRIPPING STARTS WITH
EFFICIENT DRILLING**

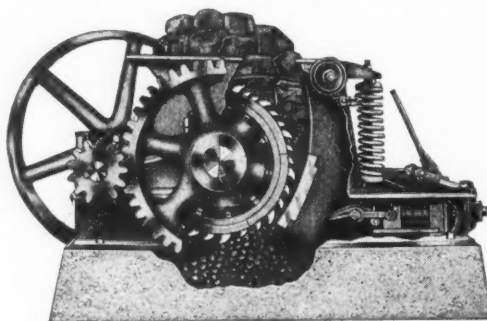
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•With Automatic Steelstrut Toggle and Quick Adjustment

DEPENDABLE

FAST



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Built for "peak" production under difficult working conditions—McLanahan Black Diamond Crushers are doing an outstanding performance job for hundreds of important

coal producers. For present needs or future modernization of your workings—call on McLanahan. Built in all capacities for any sized product required. Descriptive data on request.

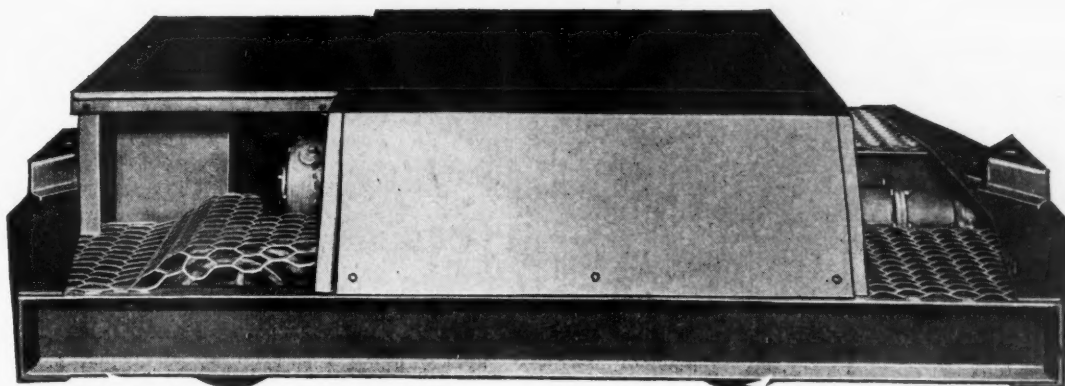
McLANAHAN AND STONE CORPORATION

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The Dustmaster...trouble free-performance

A high pressure machine that can be used on entries and in remote areas to a distance of 500 feet. Compactly and rigidly built for service.

Safety devices on all essential units to protect the equipment and operators.

Greatest distributing capacity. Built as low as 25 inches above rail. 250 lbs. of dust per minute through short hose. 125 lbs. per minute through 500 feet of hose.

Write for particulars.

The Mighty Midget...



We will demonstrate it at your mine without obligation. SAY WHEN.

A portable machine that does A WHALE OF A JOB!

Equipped with a short hose nozzle and sufficient trailing cable it can be transported to rooms to dust faces or into remote sections, back areas and air courses. In actual performance it has distributed MORE THAN A TON OF DUST PER HOUR during an entire shift including lost time. It can be dragged on its bottom, transported on belt, in coal car, shuttle car, on low truck (we build), cart (like illustrated) or on the cutter bar of a mining machine.

ONE SHOULD BE IN EVERY MINE WITH OTHER EMERGENCY EQUIPMENT

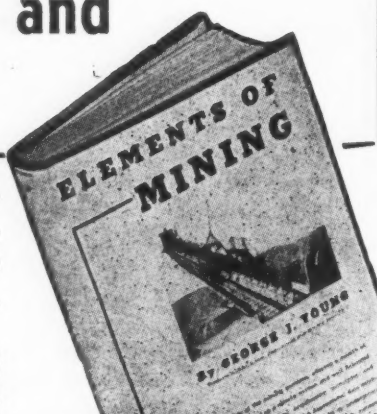
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Today's best mining methods and practices

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Check your present mining operations against the successful methods described in this new book. From basic principles involving weight, mass, work, etc.—through latest developments in the use of mechanical equipment—to specific details covering cost, accidents, mine organization, etc.—this handy book gives you the essential, useful information on mining engineering, economics, and technology. Only the most recent, most important data on the procedures and practices of mining underground ore and mineral deposits are given. Scores of helpful pointers on methods of drilling, boring, blasting rock formations, constructing and supporting ore chutes, hoisting and transporting the ore, ventilating and illuminating shafts and pits, etc., are presented clearly and understandably. Valuable related information concerning alluvial and open pit mining is included.



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May be used as protective disconnecting switch for any motor in its range or for feeder protection at night when trolley line switch is opened.

The fuses are the only part which should ever need replacement. A spring brass support for these fuses gives a quick, snap type break when opened and blades are held in line at all times by copper supports. Special reinforced clips are used, held permanently in line by grooved supports with clamp type terminal in center. Either one or two fuses may be used giving ampere capacities from 70 to 200 Amps.

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The Cincinnati

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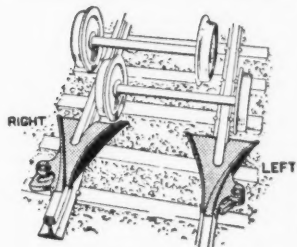
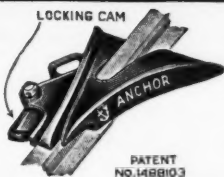
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Division of The R. K. LeBlond Machine Tool Co.
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"Anchor" Rerailers Get 'Em Back on the Tracks, Saving Time, Labor, Money



• This is the quick, efficient way to get derailed cars and locomotives back into productive service. No other rerailer has the patented, scientifically-designed features of the "Anchor" Rerailer.

Smashed hands, strained backs and often fatal accidents are eliminated when "Anchor" Rerailers are used. Safety Inspectors and Engineers highly recommend their use. Made of special high carbon steel for durability and long life.

How Anchor Rerailers Work. "Anchor" rerailers are used in pairs, and will retrack wheels from either or both sides of rail at same time. Each Rerailer straddles the rail, and the narrow end on top of the rail. The derailed wheel comes up the gradual slope, and is forced back on to the rail by the guiding grooves and ridges. Can be used anywhere on the track. The "Anchor" Rerailer is the only one that has a self-contained lock.

Size of Rerailer	For Use on Rails as Follows:	Locomotive or Car Capacity	Price Per Pair
No. 2	16 lbs. to 40 lbs.	10 tons	32.50
No. 3	30 lbs. to 60 lbs.	15 tons	37.50
No. 4	50 lbs. to 75 lbs.	40 tons	52.50
No. 5	70 lbs. to 100 lbs.	100 tons	80.00
No. 6	100 lbs. to 152 lbs.	200 tons	157.50

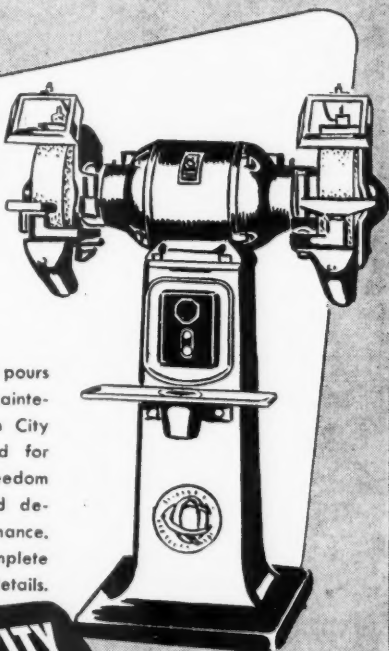
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Send Order Now! Immediate Delivery. Complete Satisfaction Guaranteed!
Free Descriptive Literature If Desired!

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Formerly The Mining Safety Device Co.

cut tool costs...

with rugged QUEEN CITY GRINDERS

It takes a top-quality grinder to stand up under the heavy work that pours through a mine maintenance shop. Queen City Grinders are noted for their durability, freedom from downtime and dependable performance. Send for catalog complete with prices and details.



QUEEN CITY MACHINE TOOL CO.

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Cincinnati 2, Ohio

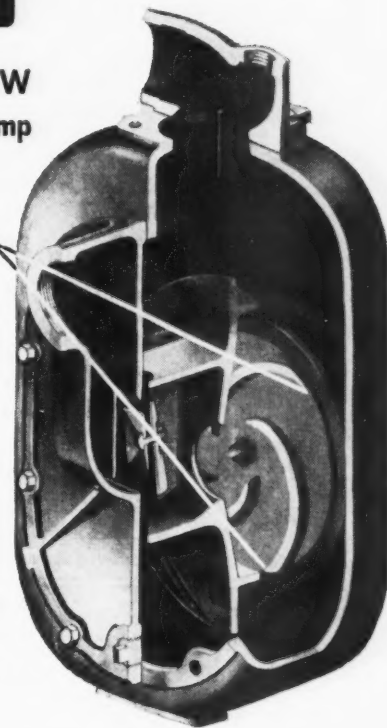
AGENTS IN PRINCIPAL CITIES

CUT DRAINAGE COSTS

with the MARLOW Mine Gathering Pump

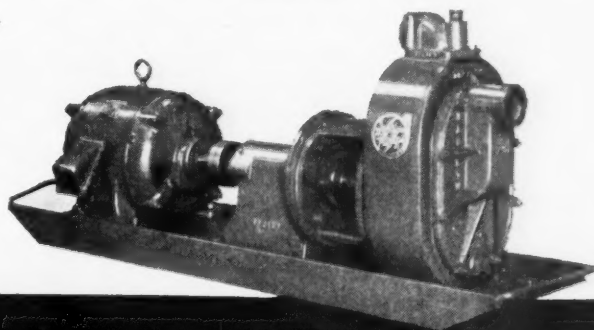
Look Inside for the reasons why!

Positive self-priming is assured—even after impeller blades become worn by excessive abrasion. Cross-section view shows why: a Marlow is built to permit relatively large clearances at impeller tips. That means longer life, less cost. Only in a Marlow will you find this design feature.

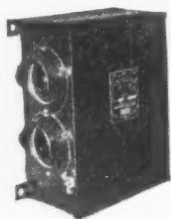


MANY OTHER REASONS

It's the fastest-priming centrifugal mine pump yet developed. Positively automatic priming on suction lifts up to 25 feet. Pumps more per hour than any other mine gathering pump. Sizes 2- and 3-inch. Sled-type base or on rubber-tired tricycle. Write for Bulletin EM 46 and name of nearest distributor.



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RIDGEWOOD, N. J.
Manufacturers of the World's largest line of
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NUSSCO AUTOMATIC MINE SIGNALS

For Main Haulage • Prevent Collisions
Save Trip Time

A two wire cable connects two or more signals together into one block. Only one signal can show proceed on the entrance of a trip, all other signals show stop.

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Thrown by Motorman

Operates Switch Safely • Saves Time and Money

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Any size or style screen, in thickness of steel
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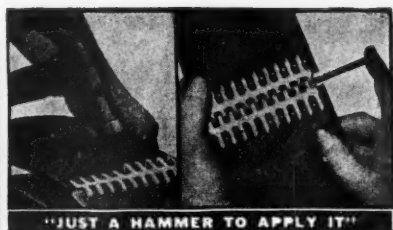
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and FASTENERS**
for transmission
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ALLIGATOR

Trade Mark Reg. U. S. Pat. Office

STEEL BELT LACING

World famed in general service for strength and long life. A flexible steel-hinged joint, smooth on both sides. 12 sizes. Made in

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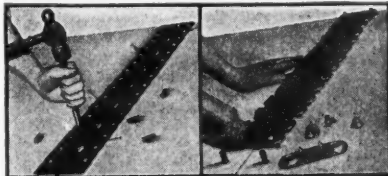
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By using Flexco HD Rip Plates, damaged conveyor belting can be returned to satisfactory service. The extra length gives a long grip on edges of rip or patch. Flexco Tools and Rip Plate Tool are used. For complete information ask for Bulletin F-100.

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"CONVEYOR BELTS EASILY FASTENED"

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LACING CO.**

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- ECONOMY FLAME SPREADER in dome.



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A Sand Pump is only a link in a chain in a coal washing plant, but it can be a strong link if it embodies the following features as does the Goyne.

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5. We carry the spare parts stock. Order your replacements when needed. Reduce your inventory by using Goyne Process Pumps.

*All inquiries receive prompt
and careful attention.*

THE GOYNE STEAM PUMP CO.
ASHLAND, PA.

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P 3345, Coal Age,
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REPLIES (Box No.): Address to office nearest you

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CHICAGO: 520 N. Michigan Ave. (11)
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COAL LANDS

Suitable for strip mining. Complete details upon request.

G. B. LORRAINE
Law Building, Richmond 19, Va.

FOR LEASE: OHIO STRIP COAL LAND, MAHONING COUNTY, OHIO

Thirteen to forty foot overburden. No hard rock. 3½ to 4 foot good coal. On hard surface roads. Close to Railroad and within 14 miles of Youngstown, Niles and Warren. Partly drilled. Level land.

Owner; Donald Kirk, Axis, Alabama

INVEST IN COAL LANDS

For Sale, 20,000 acres of virgin Pittsburgh #8 coal, near Penna. and B. & O. RR., suitable for underground mining. Also several thousand acres of stripping coal. Eastern Ohio.

For further information write to
Frank Signorelli, Realtor
Weirton, W. Va.

Truck Coal acreage on paved highway. Two seams above water 2½ percent ash semi-smokeless. None better for stoker. Twelve thousand tons removed many years ago via river barge. One seam open with improvements.

E. W. HOLT
Box 207 Central City, Ky.

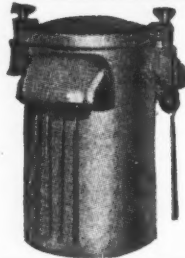
FOR LEASE

APPROXIMATELY 200,000 TONS
No. 6 OHIO COAL AVERAGING 40".

BO 3537 Coal Age
330 W. 42nd St., New York 18, N. Y.

WANTED

—TRANSFORMERS—



TRANSFORMERS WANTED

in operating condition or burnt out. Mail us list giving complete nameplate data and stating condition.

We Rewind, Repair and Redesign All Makes and Sizes
ALL TRANSFORMERS GUARANTEED FOR ONE YEAR

THE ELECTRIC SERVICE CO., INC.

"AMERICA'S USED TRANSFORMER CLEARING HOUSE"
Station M Since 1912 CINCINNATI 27, OHIO

WANTED HOIST

A 200 HP 2200 V 3 PH 60
CY motor double friction
drums slope hoist, each
drum to hold 7500 ft. of
¾" rope. Rope pull 7,000
lbs. @ 900 ft. rope speed.
Brake on each drum.

RODEN COAL COMPANY

MARVEL, ALABAMA

WANTED TIPPLE

COMPLETE 300 Ton
Hourly Capacity, four or
five track coal tippie with
loading booms, shaking
picking tables, mixing con-
veyor, track scales, crush-
ers and rescreening plant.
Interested only in standard
steel type designed last 15
years. Also need truck load-
ing bins. Please give de-
tails and price first letter.
If not complete tippie
might buy component
parts.

W-3696, Coal Age
520 North Michigan Ave.
Chicago 11, Illinois

WANTED

¾ to 5 yard Shovels
2 to 10 yard Draglines
Tractors and Dozers

Frank Swabb Equipment Co., Inc.
Hazleton National Bank Building
Hazleton, Pa.
Telephones 4911 and 4910J

WANTED TO BUY

12 lb., 16 lb., 20 lb., mine rails, new or
used, small mine spikes, 3 x ¾ and under.

SHAMOKIN IRON & METAL CO.
Box 343 Shamokin, Pa.

FOR EVERY BUSINESS WANT

"Think Searchlight First"

BARGAINS IN USED EQUIPMENT

**QUOTATIONS WILL BE MADE RECONDITIONED AND GUARANTEED, OR ON AN AS IS BASIS.
ALL EQUIPMENT IN GOOD WORKING CONDITION—SOME PRACTICALLY NEW.**

COAL CUTTERS

- 4—Sullivan CE-7 AC Short Wall, complete with Standard and Tip-turn Trucks, most machines with Power Cable.

TROLLEY LOCOMOTIVES

- 1—4½ Ton Goodman equipped with Cable and Power Reel, 36" Gauge.
- 2—7½ Ton Goodmans, 36" Gauge.

MACHINE SHOP EQUIPMENT

- 2—Drill Presses 16" to 26".
- 1—200 Amp. Smith Welder—on wheels.
- 1—18" Gould & Eberhardt Shaper.
- 1—Cleveland Combination Punch & Shear, 26" Throat.
- 1—Power Hack Saw, B.D.
- Bolt & Pipe Threaders, Chain Blocks, Swing Cranes with Crawls, Wood Planer, Saw Table, Hand Shears, etc.
- 1—2" Oster Pipe Threader—Motorized.

COAL WASHING EQUIPMENT

- 2—Rheolaveur Launderers, complete with Steel Supporting Frame.
- 1—60" Dia. Dividing Table, direct connected to 2 H.P. D.C. Motor.
- 1—Galigher Auto. Sampler with adjustable stroke & direct connected to a 1/6 H.P. Motor.
- 1—12' x 10' Steel Hopper Bin.
- 1—70' x 12' Dorr Thickener Tank, complete with mechanism.

COAL CRUSHERS

- 2—30"x30" Jeffrey Single Roll.
- 1—36" St. Louis Ring Type.
- 1—24x20 Jeffrey Swing-Hammer Mill.

JOY LOADERS

- 1—7-BU Joy Loader, Cat Mounted, Low Pedestal, 250 Volts DC, Overhauled and Guaranteed, Permissible Type.

PUMPS

- 1—2" Marsh, V-Belted to 15 H.P. Motor 150 GPM, 160' Head.
- 2—10x10 Allis-Chalmers Centrifugal, 1500 GPM, 56' Head, direct connected to a 100 H.P., 2300 Volt Center Drive Motor.
- 5—5x5 Deming Oil-Rite Piston Pumps—Motorized.

RAILROAD SCALES

- 3—100 Ton Fairbanks, Steel I Beam Stringers, Inspected by W. W. & I. B. in April, 1947.

COKE EXTRACTORS

- 2—Coke Extractors, 250 Volts DC, trolley operated, Std. R. R. Gauge.

STEEL BINS

- 1—16' x 24' Sectional Steel Bin.
- 2—10' x 20' Welded Steel Bins.

LARRY CARS

- 4—Connellsville Larry Cars, Trolley Operated, 6 Ton Capacity.

CONVEYORS

- 3—24" Belt Conveyors, 15' to 85' Centers, 2 equipped with Ding's Pulleys.
- 1—30" Belt Conveyor, 370' Centers.
- 1—30" Belt Conveyor, 70' Centers.
- 1—36" Belt Conveyor, 50' Centers.
- 1—28" Apron Conveyor, 21' centers. Flight Conveyors from 12" to 30" up to 170' centers.

RAILS

- 15 Tons—30# Relayers. 75 Tons—65# Relayers.
- 25 Tons—40# Relayers.

MINE FANS

- 1—8-H60 Aerodyne Exhausting Fan, with Air Locks, Hood, etc. with 75 H.P. Motor—Purchased new in 1942.

HOISTS

- 1—No. 22 Vulcan, with Man Cage, 30' Steel Head-frame and 40 H.P. Single Speed Elevator Type Motor, equipped with Solenoid Brake (Both Hoists purchased new in 1942 and 1944).
- 1—Single Drum Gasoline Hoist, direct connected to 2½x4¼ Wisc. Gas. Engine.
- 1—15 H.P. Single Drum Hoist, direct geared to motor with Controller and Grids.

PIT CARS

- 160—Card Iron Works R. B. Pit Cars, 36" Ga.
- 1—Card Iron Works Rock Car, 90 Cu. Ft. Cap.

MISCELLANEOUS

- AC & DC Motors, new & used, from 2 H.P. to 75 H.P.
- R.C. Stranded Copper Wire, 2/0—4/0 & 350,000 CMS.
- Trolley Wire 2/0 & 4/0 Rd. & Fig. 8.
- Trolley Hangers and Supplies, New and Used.
- Wall Telephones, Jacks, \$20,000.00 worth of New Supplies.
- New CE-7 Sullivan Coal Cutter Parts.
- New and Used Wire Rope, ¾" to 1¼".
- 750' New 3-Cond. No. 6 All Rubber Power Cable.
- 1—3,000' Tramway, complete with buckets, etc.
- 1—750' Jig-back Tram, complete with motor.
- Office Equipment, Electric Calculators, Typewriters, Desks, Filing Cabinets, etc.
- 1—Stiff-Leg Derrick, with crabs and cable.
- 3—Steel Lockers, 6 and 9 Compartments.
- 6—200 Gal. Galvanized Oil Tanks.
- 12" and 18" I Beams.
- Bucket Elevators.
- 1—50 H.P. Cutler-Hammer DC Controller, with 2 Banks, Grids, Panel, etc.
- Switchboard Equipment for DC Motors.
- Fire Extinguishers—1 Qt. to 5 Gal.
- 5—Permissible Type all service gas masks and 38 Permissible Cannisters.
- Double and Single Electric Gongs.
- 1—Ro-Tap Testing Shaker.
- 1—No. 5 Buffalo Forge Blower, direct connected to 3 H.P. A.C. Motor.

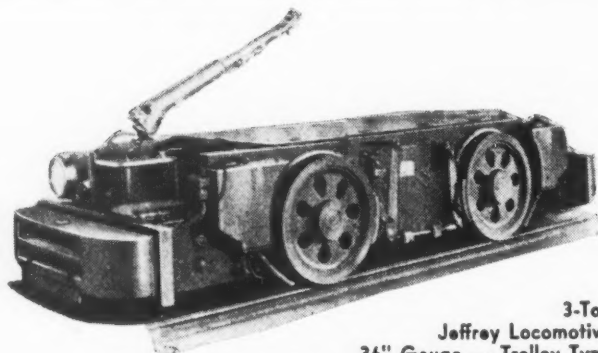
**WRITE FOR OUR COMPLETE INVENTORY
AND SAVE MONEY ON YOUR PURCHASES**

FLORENCE
MACHINERY AND SUPPLY COMPANY
SUITE 904, EQUITABLE BUILDING DENVER 2, COLORADO

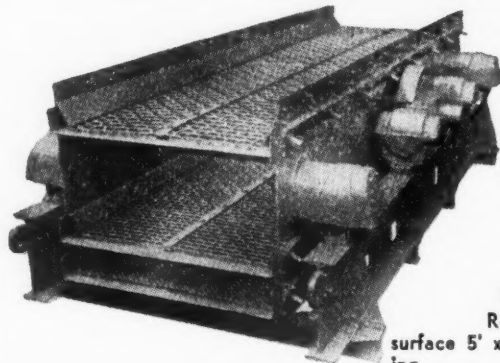
C. J. Parrish, Mgr.
Phone: Alpine 2803
Yards: Denver and Florence, Colo.

COMPLETE LIQUIDATION IMMEDIATE DELIVERY

*... Three and one-half million
dollars in new and nearly
new coal mining machinery
and equipment*



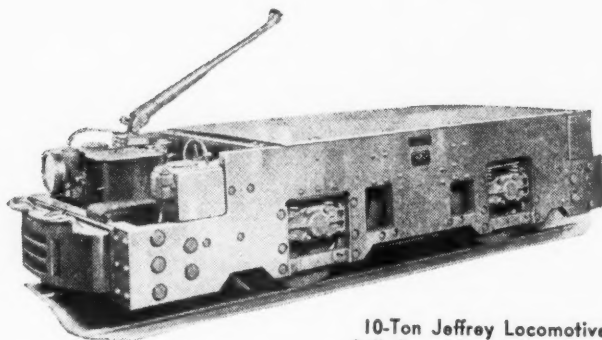
3-Ton
Jeffrey Locomotive
36" Gauge — Trolley Type



Type F-600 Ty-
Rock Screen 2—
surface 5' x 10' Full Float-
ing.



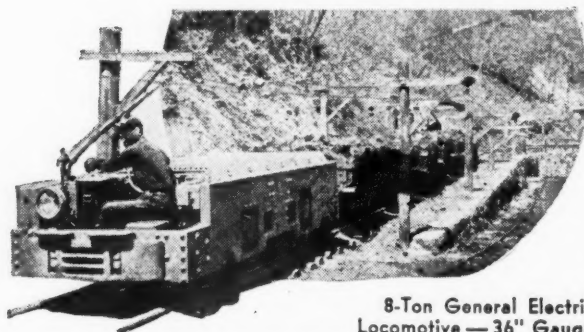
6-Ton Jeffrey Locomotive 36" Gauge — Trolley Type



10-Ton Jeffrey Locomotive
36" Gauge — Trolley Type



20-Ton Goodman Locomotive High Type — 36" Gauge



8-Ton General Electric
Locomotive — 36" Gauge

THE COLUMBINE MINE EQUIPMENT CO., INC.

FLAT IRON BUILDING, 1669 BROADWAY

DENVER 2, COLORADO

Subsidiary of Portland Equipment Co., 11 Broadway, New York 4, N. Y.

WRITE FOR OUR COMPLETE LIST OF MACHINERY AND EQUIPMENT

SEE PAGE 213 FOR APPROXIMATE SUMMARY OF HARD-TO-GET OFFERINGS

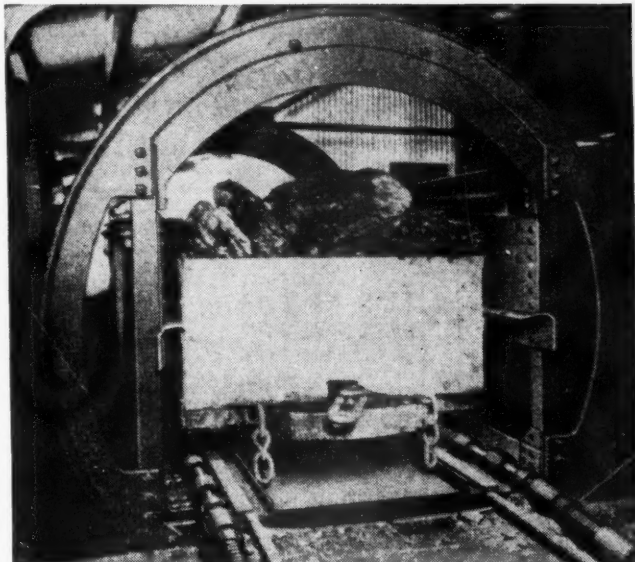
THE COLUMBINE MINE EQUIPMENT CO., INC.

1669 BROADWAY, DENVER 2, COLORADO

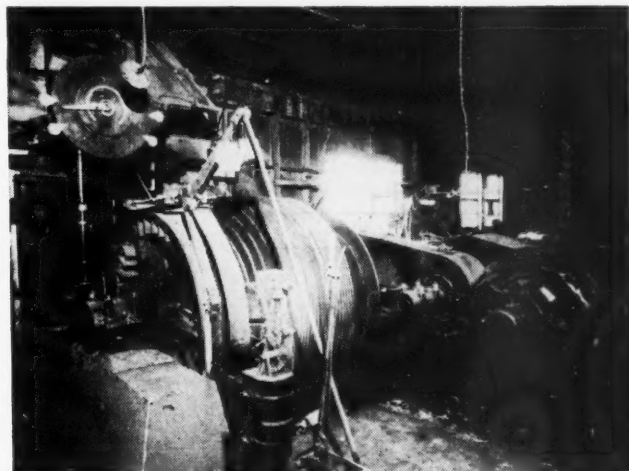
Subsidiary of Portland Equipment Co., 11 Broadway, New York 4, N. Y.

Complete Liquidation . . . Immediate Delivery

*... Three and one-half million
dollars in new and nearly
new coal mining machinery
and equipment*



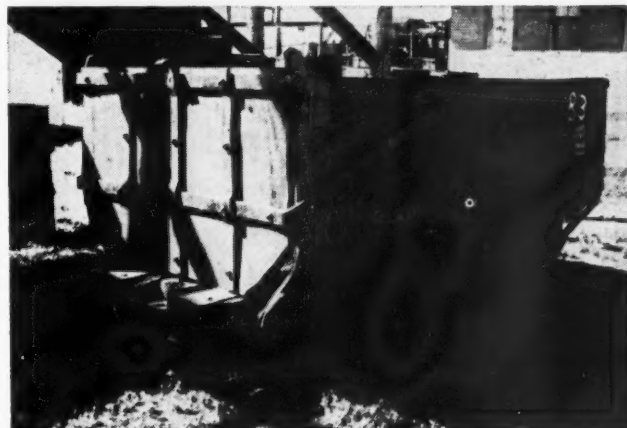
ROTARY CAR DUMPER
Fast Dumping of Coal Cars



Cornical Drum Hoist, 300 HP, Drum 8'-6" Dia. x 72" wide



Phillip's Crossover Dump and Car Retarder



Tipple Car, 2 Ton, 36" Gauge

HERE ARE SOME OF THE HARD-TO-GET OFFERINGS

150—2 Ton 36" Ga. Mine Dump Cars, roller bearing.
HAULAGE MOTORS, trolley type locomotive—250 Volt D. C.—electrically driven, 36" gauge, General Electric, Westinghouse, Jeffrey and Goodman.
COAL MINING MACHINES—29 L-E "Arcwall" Jeffrey mining machines mounted on Joy electrically driven caterpillar trucks.
Goodman Shortwall No. 112 mining machines.
Goodman 36" Gauge TRUCKS, Type "M."
MINING MACHINE TRUCKS—Joy "T-1."
MOTOR GENERATOR SETS—I set 225 H.P. connected to Ridgeway 150 K.W. generators, with panelboards, A.C. and D.C. meters and transformers complete. I set 300 H.P. connected to Ridgeway generators, 200 K.W., complete with panelboards, A.C. and D.C. meters and transformers. And others.
BATTERY CHARGING UNITS—Joy, Westinghouse, Hobart Bros. Co., Electric Products Co.
MOTORS—A.C. and D.C., all types, 1 H.P. to 300 H.P., starting compensators and switches.
TRANSFORMERS—General Electric, Westinghouse, 7½ KVA, 37½ KVA and 150 KVA.
BOX CAR LOADERS—Ottumwa—Manerre.
PUMPS—Geared and centrifugal—motor and belt driven—Gould, Demming, and Myers.
FANS—American Blower, Sturdevant.
TIPPLE—3 track tipple consisting picking screens, grizzlies, car retarders, end dump, belt conveyors, elevator bucket conveyors, box car loaders complete.
VIBRATOR SCREENS—Ty-Rock Tyler F-600 2 surface 5'x10' Screen, full floating.
SHAKER SCREENS—"Marcus" shaker screens.
CONVEYORS—Flight conveyors, elevator conveyors.
COAL CRUSHERS.
RAILS—150 tons 60 lb., 350 tons 65 lb.
SPIKES, bolts, tie plates, frogs, switches, switch throws.
COPPER trolley wire—2/0, figure 8 and 4.0 round.
TROLLEY HARDWARE—Hangers, clamps, frogs, switches, roof hangers.
TRANSMISSION WIRE—Single conductor, 2 conductor, 3 conductor—Neoprene, glass, rubber insulated 2/0 to 500,000 CM.
JOY 7-BU. LOADERS—Caterpillar mounted with high pedestal.
SHUTTLE CARS—Joy 42D storage battery.
ELEVATOR CONVEYORS—Joy.
AIR COMPRESSORS.
MACHINE SHOP—Complete.
ELECTRIC SHOP—Complete.
CARDOX PLANT—Complete.
BATTERIES—Exide and Gould Ironclad, 24 cells.
\$150,000.00 WORTH of new parts, bearings, gears, bolts, nuts and screws for Joy, Jeffrey, Goodman, Ottumwa, Manerre, General Electric, Westinghouse, Demming, and other popular manufacturers' equipment.

ALSO THOUSANDS OF ITEMS TOO NUMEROUS TO MENTION.

WRITE FOR OUR COMPLETE LIST OF MACHINERY AND EQUIPMENT

FOR SALE

CUTTING MACHINES—250 VOLT DC

- 20—12-AA Goodman, 50 HP
- 12—112-AA Goodman Universal, 50 HP
- 5—112-CA Goodman Universal, 50 HP
- 22—CE-7 Sullivan Tip-turn trucks
- 3—Jeffrey late type 29-L Arcwall Machines
- 3—Jeffrey 29-LE Arcwall Machines
- 2—Jeffrey late type 29-U, 250 volt Machines

LOADING MACHINES—250 VOLT DC

- | | |
|-----------------|----------------|
| 5—L-400 Jeffrey | 2—11-BU Joy |
| 2—260 Goodman | 3—Myers-Whaley |
| 8—7-BU Joy | 6—5-BU Joy |

LOADING AND CUTTING MACHINES—220/440 VOLT AC

- 8—7-BU Joy. Just taken out of service.
- 8—112-G3 Goodman Universal, tip-turn trucks, cable reel and cable.

LOCOMOTIVES—250 VOLT DC

- 2—13-ton Westinghouse, type 908-C
- 3—8-ton Westinghouse, type 906-B
- 6—8-ton General Electric, type HM-838
- 5—8-ton Goodman, type 32-1-4-T-2
- 6—6-ton General Electric, type HM-801

600—END DUMP 3½-TON STEEL MINE CARS

- | | |
|----------------------------------|--------------------------|
| Height overall—45" | Axles—3" |
| Length of body—9' | Steel bodies—3/16" |
| Overall length—10'2" | Draw bar—1"x4" |
| 18" Timken roller bearing wheels | Oak bottoms—3" |
| Wheel base—36" | 3—Link couplings |
| Width—60" | 3—Binders |
| | Spring draw head one end |
| | Track gauge—42" |



Frank J. Wolfe

We specialize in buying complete mines that are going out of business or from receivers in bankruptcy, administrators of estates, etc.

COAL MINE EQUIPMENT SALES CO.

306-307 BEASLEY BUILDING L.D. PHONE-34 TERRE HAUTE, INDIANA

MOTOR GENERATORS

500 KW GE. SYN., 575 V., 2300/4000 V., 3 Ph., 60 Cy., 900 RPM. Complete Manual Switchgear.

400 KW WEST SYN. 575 V., 2300/4000 V., 3 Ph., 60 Cy., 720 RPM. Complete Manual Switchgear.

300 KW RIDGWAY SYN., 275 V., 2300/4000 V., 3 Ph., 60 Cy., 1200 RPM. Complete Manual Switchgear.

LOCOMOTIVES

- 10-T JEFFREY, 250 V., MH-110 Mts., 36"-48" Ga.
- 10-T WEST., 250 V., 907-C Mts., 36"-44" Ga.
- 8-T WEST., 250 V., 906-C Mts., 42"-48" Ga.
- 6-T G.E., 250 V., HM-701 Mts., 22"-32" Ga.
- 6-T WEST., 250 V., 903-B Mts., 22"-30" Ga.

Each unit listed above is owned by us and is available now for immediate purchase

WALLACE E. KIRK COMPANY

501 Grant Building, Pittsburgh, Pa.

COAL CUTTING MACHINES

- 1—35 B Jeffrey Shortwall, 250 V. D.C.
- 1—35 BB Jeffrey Shortwall, A.C.
- 1—29 C Jeffrey Arcwall, 250 V. D.C.
- 1—124 E. J. Goodman Slabbing, 250 V. D.C.
- 1—36 B Jeffrey, 250 V. D.C.
- 1—12 G3, Goodman Shortwall, A.C.

LOCOMOTIVES

- 1—5½ ton Goodman with 2 type 41, 250 V. motors.
- 1—6 ton GE Gathering Locomotive.
- 1—d ton Jeffrey Gathering Locomotive.

M. G. SETS

- 1—60 KW, 250 V. D.C. with 100 HP, Synchronous motor.
- 1—75 KW, 250 V. D.C. with 112 HP, Synchronous motor.
- 1—150 KW, Ridgway, 275 V. D.C., 3/60/2200/1200.
- 1—200 KW, Westinghouse, 600 V., 3/60/2200.

ELECTRIC MOTORS

- 1—500 HP, GE Slipring 3/60/2200/600 RPM.
- 1—400 HP, Allis-Chalmers, SC, 3/60/2200/1150.
- 1—250 HP, GE, type I, Form M.
- 1—185 HP, Burke SC, 3/60/2200/1150.
- 1—150 HP, GE, Squirrel Cage, 3/60/900.
- 1—125 HP, GE, Squirrel Cage, 3/60/900.
- 1—100 HP, Synchronous Motor, 3/60/440/1200 RPM.
- 1—100 HP, GE, Squirrel Cage, 3/60/900 RPM.
- 1—40 HP, GE, 1200 RPM, 3/60/220-440 V.
- 4—25 HP, GE, Squirrel Cage, 3/60/865 RPM.
- 2—15 HP, Westinghouse, Squirrel Cage, 3/60/900.
- 2—10 HP, Westinghouse, CS, 3/60/440 V.
- 1—7½ HP, Squirrel Cage, 3/60/1800.
- 1—6 HP, Westinghouse, Squirrel Cage, 3/60/1800.

TRANSFORMERS

- 1—25 KVA, GE 1/60/2300/220/110 V.
- 2—75 KVA, Westinghouse, 1/60/6600/2200.

TIPPINS MACHINERY CO.

Pittsburgh 6, Pa.

LOCOMOTIVES & CRANES

- 80 ton Lima 6 wheel Switchers. New 1944.
- 65 ton Whitcomb Diesel-Electric. New 1944.
- 50 ton Gen. Elec. Diesel-Electric.
- 70 ton Porter Fireless steam locomotive.
- 30 ton Plymouth Gas Locomotive. New 1944.
- 2 yd. Lima Diesel Crawler Crane. 100' bm.

MISSISSIPPI VALLEY EQUIPMENT CO.

511 Locust St. St. Louis, Mo.

FOR EVERY

BUSINESS WANT

"Think Searchlight First"

RAILS

20# to 110# New Rails
25# & Heavier Relay Rails

TRACK ACCESSORIES

Tie Plates—Bolts—Spikes
New & Used Ties
Angle & Splice Bars

SWITCH MATERIALS

Frogs—Switches
Guard Rails—Switch Stands
New & Used Switch Timbers

"One Piece or Carload Quantities"

MORRISON

RAILWAY SUPPLY CORP.

Rand Bldg.	Write	Empire Bldg.
MOhawk 5820	Phone	3-6196
Buffalo 3, N. Y.	Wire	Birmingham 3, Ala.

RAILS NEW AND RELAYING

TRACK ACCESSORIES

from **5** Warehouses

- PROMPT SHIPMENTS
 - FABRICATING FACILITIES
 - TRACKAGE SPECIALISTS
- EVERYTHING FROM ONE SOURCE

L. B. FOSTER COMPANY

PITTSBURGH • CHICAGO • NEW YORK
HOUSTON • SAN FRANCISCO

RELAYING RAIL

TRACK ACCESSORIES

MIDWEST STEEL CORP.

Gen. Off.: CHARLE TON 21, W. VA.

Warehouses
CHARLESTON, VA.
KNOXVILLE, TENN. • PORTSMOUTH, VA.

RAILS—CARS

All sections of rails and good serviceable second hand cars, all gauges, also spikes, bolts, frogs, switches and ties.

M. K. FRANK

480 Lexington Ave. New York, N. Y.	810 Park Bldg., Fifth Ave. Pittsburgh 22, Pa. Carnegie, Pa.
Reno, Nevada	

REBUILT EQUIPMENT—READY TO SHIP

MOTOR GENERATOR SETS—250 v. D.C.

(Motors 220/440 or 2200 v., 3 ph., 60 cy.)

No.	KW.	Make	Speed
1	500	Allis Chal.	1200
1	200	G. E.	1200
1	175	West.	1200
1	150	Ridgway	900
1	125	Allis Chal.	1150
1	110	West.	700
1	100	Allis Chal.	1150
2	75	G. E.	1750
1	50	Ridgway	1200
1	50	Ideal	1750
3	40	West.	900
1	30	West.	1200
1 New	25	Burke	1800

D.C. GENERATORS — 250 v. D.C.

No.	KW.	Make	Speed
2	300	Ideal	1200
6	250	West.	1200
1	250	Allis Chal.	1200
1	175	G. E.	700
3 New	135	G. E.	1150
1	125	West.	560
1	125	Allis Chal.	1150
1	110	West.	700
1	100	Allis Chal.	1150
1	75	West.	750

A.C. GENERATORS—2200/4000/440/220 v.

No.	KW.	Make	Speed
1	125	West.	257
1	450	Elec. Machy.	120

D.C. MOTORS—230 volts

No.	H.P.	Make	RPM.	Type
1	175	G. E.	550	MD
3 New	150	G. E.	875	CDM
2	150	Star	1800	F-92
3 New	133	G. E.	875	CDM
1	125	Allis Chal.	850	E. R.
1	80	West.	450	—
3	40	West.	625	MC
3	40	Cr. Wh.	1700	CM
1	30	Cr. Wh.	1750	CMC
1 New	25	West.	600	SK-113
1	25	F. M.	950	CP
1	25	West.	1100	SK

230 V. D.C. MAGNETIC STARTERS AND CONTROLLERS

- 456—New 1 HP. Cutler Hammer across the line.
- 111—New 1 HP. Cutler Hammer across the line.
- 30—New 2 HP. Cutler Hammer across the line.
- 55—New 5 HP. Cutler Hammer drip proof. 2 step current limit OL and LV.
- 58—New 7 1/2 HP. Cutler Hammer.

- 60—10 HP. Cutler Hammer Magnetic.
- 12—10/15 HP. 230 v. Westinghouse Magnetic Drip Proof Controllers, 2 steps acceleration thermal overload relay with stop, start and reset buttons.
- 9—New 10/15 HP. 230 v. G.E.
- 10—New 20/35 HP. 220 v. Ward Leonard Magnetic.
- 10—New 40 HP., 230 v. G.E. Magnetic.

A.C. MOTORS—4000/2200/220/440 V.—3-Ph., 60 Cy.

No.	HP.	Make	Rpm.	Type
1	500	Elec. Mach.	120	Syn.

CONVEYORS

- 3—G-20 Goodman Shaker Conveyors each with a Goodman Duck Bill complete with motor equipment with 250. DC. motors.

PUMPS with A.C. or D.C. MOTORS

Qua.	Gpm.	Head	Kind	Make
3	1200	300	Cent.	Worthington
3	1100	323	Cent.	Worthington
3	1000	336	Cent.	Worthington
3	900	365	Cent.	Worthington
3	800	378	Cent.	Worthington
3	800	150	Cent.	Worthington
3	735	161	Cent.	Worthington
3	665	168	Cent.	Worthington
3	600	182	Cent.	Worthington
1	600	105	Cent.	Dayton Dowd
1	600	100	Cent.	Morris
1	532	139	Cent.	Worthington
1	500	115	Cent.	Dayton Dowd
1	500	123	Cent.	Morris
1	450	40	Cent.	Gardner Denver
1	400	50	Cent.	Dayton Dowd
1	400	140	Cent.	Morris
1	335	60	Cent.	Dayton Dowd
1	300	145	Cent.	Morris
1	300	125	Cent.	Dayton Dowd
1	244	60	Cent.	Dayton Dowd
1	210	60	Rotary	Nat'l Transit
2	200	125	Cent.	Worthington
1	200	72	Cent.	Morris
1	200	125	Cent.	Dayton Dowd
2	180	150	Cent.	Worthington
8	180	10	Cent.	Allis Chalmers
8	170	12	Cent.	Allis Chalmers

LOCOMOTIVE MOTORS

- 3—Westinghouse MH-58 36 H.P., 500 v., 430 rpm.

"Write for Stocklist"

DUQUESNE ELECTRIC & MFG. CO., PITTSBURGH [6], PA.

Montrose — 5800

FOR SALE

CONVERTER

- 1—300 KW Allis-Chalmers rotary converter, 250 volts, DC, 1,200 amps, 185 AC volts, 800 amp., 6 phase, 60 cycle, 1,200 RPM, complete with 3—Allis-Chalmers indoor type transformers, 125 KVA each, single phase, 60 cycle, high voltage 6,600 and taps, low voltage 185-92.5, 55° C. impedance 9.2, this set is complete with switchboard and brand new I-T-E automatic circuit controller, 1,600 amps, 275 volts, DC, type RSA class 1, #19062, this set in perfect operating condition.

CRUSHERS

- 1—Stephens Adamson 30x30 double roll crusher. Will crush from 2" down to 1 1/4".
- 1—Link Belt 36x60 double roll crusher, equipped with gear drive.
- 1—American Pulverizer crusher, #1627. Type AC, machine number AC3B, crushes from 20" down to 1/4".
- 1—McNally Pittsburgh 18x18 double roll crusher.
- 1—Jeffrey single roll crusher, size 36x36, No. 4507. Will crush maximum lump of 20" at rate of 250 tph to a product of 1 1/4" when operating at 300 rpm. Direct connected by flexible coupling to 75 HP. GE motor, 3/60/440, speed full load 885, ball bearing, fan cooled.

FAN

- 1—Bayley #17, Plexiform fan, type F, wheel dia. 83 3/4", circumference, 24.478 ft. outlet area, 39.376 sq. ft. Capacity ranges from 39.376 CFM at outlet velocity of 1,000 to 141,759 CFM at outlet velocity of 3,000.

LOCOMOTIVES

- 1—4 ton Mancha Battery locomotive, equipped with Gould Batteries, 36" gauge.
- 2—4 ton Westinghouse locomotives, ball bearing, 36" gauge, 250 volts, DC.
- 2—4 ton Westinghouse locomotives, ball bearing, 36" gauge, class 4-2-15-C-253.
- 1—5 ton Goodman locomotive, type W12A5, 42" gauge, 250 volts, DC.
- 1—6 ton Goodman locomotive, 36" gauge, 250 volts, DC.

- 1—6 ton Goodman locomotive, type 3304T, ball bearing, 36" gauge, 250 volts, DC.
- 1—6 ton General Electric locomotive, classification LM276MM5, R86E type controller, 36" gauge, 250 volts, DC.
- 3—8 ton Goodman locomotives, ball bearing, 36" gauge, type 32A04T.
- 1—10 ton General Electric locomotive, ball bearing, 36" gauge, 250 volts, DC.

MINING MACHINES

- 2—Sullivan type CH8, AC longwall mining machines, 3 phase, 60 cycle, 220 volt, 30" cutter bars, complete with 300' each of 3/4" conductor mining machine cable.
- 2—Goodman Universal mining machines, type 112G3, 36" gauge.
- 1—Goodman type 512DG3A, AC shortwall mining machine. Complete with cable and jack, 8' cutter bar. No trucks.
- 1—Jeffrey 35BB, AC shortwall mining machine, 8' cutter bars, complete with tip turn truck, cable and reel.
- 1—Goodman Universal mining machine, 112AA, 42" gauge, 250 volts, DC, 8' cutter bar.

MOTOR GENERATOR SETS

- 2—40 KW Westinghouse motor generator sets consisting of Westinghouse DC generators, #140L, type SK, compound wound, 40 KW, 250 volts, 180 amps, 1,140 RPM direct connected to a Westinghouse motor, type CCL, 60 HP., 220 volts, 144 amps per terminal, 3 phase, 60 cycle, 1,140 RPM complete with manually operated switchboard.
- 1—50 KW motor generator set, consisting of: 75 HP. Crocker Wheeler DC motor, compound wound,

HOISTS or WINCHES

- 200—1 1/4-ton Hand Cranked ratio 27:1 thru an enclosed double reduction gear unit with 4 planetary gears mounted on steel plate complete with 48' of 1/4" cable, ratchet type brake, push button release.
- 1—22,500 lbs. Rope Pull 37.5 fpm Electric driven Winch or Car Puller, Stephens Adamson complete with 10:1 Ratio Speed Reducer, 750 ft. 1" dia. steel wire rope belt driven by 25 HP. A.C. or D.C. Motor.

CAR PULLERS

- 100—Brand New with 1/4" cable, 1 1/2 and 2 ton A.C. or D.C. Motors.
- 1—Stephen Adams Car Puller, 1" dia. cable 10:1 with 25 A.C. or D.C. Motor.

TRANSFORMERS

- 20—NEW 25 kva., 460 v. pri. 230/115 v. sec. 1 ph. 60 cy. Allis Chalmers.

COMPRESSORS

- 1—315 CFM Ingersoll Rand Portable, 100 lbs. pres., driven by 105 HP. Waukesha Oil Engines, 860 rpm.
- 10—240 CFM Westinghouse 3 cyl. vert. 150 lb. pres. with dir. con. 54 H.P. Westinghouse slipring Mtrs. 220/440/3/60 Automatic Unloaders.

STORAGE BATTERY LOCOMOTIVE

- 2—4-ton Goodman type M with Edison 63-G-18 battery with 2 motors, 11 hp., 80 v. with double reduction gear, speed 3 1/2 MPH, 2,000 lbs. draw bar pull. Spare set of batteries and battery box, also spare parts.

ENGINE GENERATOR SETS

- 6—New 1 kw., Homelite portable, 14.25 Gas
- 3—New 1 1/2 kw., Homelite, 115 v. 1 ph., 60 cy. portable Gas
- 3—1 1/2 kw., Homelite, 14.25 v. D.C., portable Gas
- 6—2 kw. NEW Homelite, 28.5 v. D.C. Gas
- 3—5 kva, 120/240 v., 1 ph., 60 cy., dir. con. to 6 HP. Witte DIESEL
- 2—10 kw., 120 v., D.C. 1200 rpm., dir. con. to Hercules Diesel
- 3—New 25 kw. 120/208 v. 3 ph. 60 cy. Westinghouse dir. con. to 4 cyl. 70 HP. Terol Gas Engine
- 2—30 kw. G.E. 125 v. Buda DIESEL
- 1—25 kw., Ridgway 220/3/60 Steam
- 2—30 kw., 110/220 v. 60 cy. 1200 rpm Rogers DIESEL
- 10—100 kw. 250 v. D.C. Superior DIESEL
- 1—125 Kva., 220 v., 3 ph., 60 cy., Erie Ball STEAM

- #254053, 230 volts, 273 amps, type CCM, size 50H, connected to 75 HP. Westinghouse AC motor, 220 volts, 1,170 RPM, 3 phase, 60 cycle, 166 amps, type CB, #1504169, complete with compensator for AC end, but no switchboard for DC end.
- 1—50 KW motor generator set, AC end, 2,200 volts, DC end 250 volts, complete with compensator, and switchboard. Perfect condition.

HOISTS

- 1—Ottumwa Iron Works single rigid cylinder-conical drum hoist, serial number 4080, complete with remote control and hydraulic brakes, constructed for following hoisting conditions: Weight of cage 6,000±, weight of car, 1,600±, weight of coal average 2,500±, total cage travel 277 ft. (HMD), size of rope 1 1/4", trips per hour 78, rest period 15 sec. Balanced hoisting without slack rope, end lift. Post brake 72" diameter, 8" face. Direct connected to Western Electric 150 HP motor, 3 phase, 60 cycle, 440 volts, slip ring speed full load 700 RPM, complete with automatic switchboard.

Other types and sizes of hoists, with and without motors.

PUMPS

All sizes and types of pumps.

RAILS

Approximately 200 tons 30± second-hand relaying rails.

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GAVENDA BROTHERS, Inc.
CANTON, ILLINOIS



SHOVELS - DRAGLINES - TRACTORS - DRILLS

1055 P&H Combination 3-yard Shovel and Dragline. Standard shovel front, 3-yard dipper. Dragline boom 90', 3-yard bucket, Buda diesel engine. Machine 1 year old.

Model 1500 PH Electric Dragline. 135' boom, 3 1/2-yard bucket. 3 phase, 60 cycles, 2,300 volts. Excellent condition.

1201 Lima High Lift Shovel. 42' boom, 32' stick, 2 1/2-yard dipper, Waukesha diesel engine.

955 P&H Dragline. 80' boom, 3-yard bucket, D17000 Caterpillar engine.

95 Northwest Dragline, Murphy diesel 80' boom, 2-2 1/2-yard bucket, Kohler light plant. Completely overhauled.

80D Northwest Combination 2 1/2-yard Shovel and Dragline.

40A Marion Dragline. 85' boom, 2 1/2-yard bucket. Completely rebuilt.

585 Link-Belt Diesel Dragline. 70' boom, 2 1/2-yard bucket, D17000 Caterpillar diesel engine. Completely rebuilt.

802 Lima Diesel Dragline. 75' boom, 2 1/4-yard bucket, Waukesha-Hesselman engine.

Osgood Victor 2-yard Shovel. D17000 Caterpillar engine.

48-B Bucyrus-Erie Combination Shovel and Dragline. Standard 2-yard shovel front, 65' dragline boom.

78D Northwest Shovel and Dragline. 2-yard dipper, Murphy diesel engine. Dragline boom 60'. Completely rebuilt.

Model 3000 Manitowoc 1 3/4-yard High Lift Shovel and Dragline.

Osgood Victor 1 3/4-yard Combination. 23' boom, 18' stick, 1 1/2-yard dipper, 60' dragline boom, 1 1/2-yard bucket, and D13000 Caterpillar engine.

Model 77 Lorain Shovel. 1 1/2-yard dipper. 13,000 Caterpillar engine. Recently overhauled.

Northwest Model 6 Combination 1 1/2-yard Shovel and Dragline. Murphy diesel engine. Like new.

Model 602 Lima 1 1/2-yard Combination Diesel Shovel and Dragline. Waukesha diesel engine.

Model L-55 Lorain 1-yard Shovel. Waukesha Gas Engine.

Model K-370 Link-Belt Dragline. 60' boom, 1 3/4-yard bucket. Waukesha-Hesselman diesel engine. One year service.

Model 362 Marion Combination 1 1/2-yard Shovel and Dragline. D13000 Caterpillar diesel engine. Completely rebuilt.

105 Northwest Combination Shovel and Crane. 24' boom, 17 1/2' stick, 1-yard dipper, 35' crane boom, Twin City 4-cylinder gas engine.

342 Marion Combination 1-yard Diesel Shovel and Dragline. Used nine months.

Type 34 Lima Paymaster 3/4-yard Combination Diesel Chain Crowd Shovel and Backhoe. 18' boom, 15' handle, 3/4-yard dipper, and G.M.C. diesel engine. Backhoe has 8'7" arm and 3/4-yard bucket. Machine worked only two months.

Buckeye 3/4-yard Combination Shovel, Backhoe, Dragline and Crane. 8-cylinder Chrysler Industrial Engine.

Osgood General 3/4-yard Diesel Shovel. Completely rebuilt.

Model 20B Bucyrus-Erie 3/4-yard Diesel Shovel.

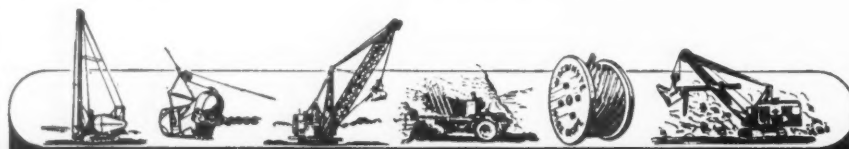
P&H Model 150 1/2-yard Diesel Shovel.

Model 44 Loomis Clipper Blast Hole Drill with new Hercules engine.

D-8, D-7, D-6, and D-4 Caterpillar Tractors and Dozers.

D-7 Caterpillar Tractor with LeTourneau 12-15-yard Scraper.

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Rail Bonds—7 Inch, 4/0—Asbestos Mittens, Safety Spectacles.

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2200V 60 CYC. 3 PH.

1—50 H.P. G.E. KR 527 1800 RPM.
1—50 H.P. G.E. MT slipring, 695 RPM.
1—60 H.P. G.E. West. CS 8B 1800 RPM.
1—100 H.P. G.E. KT 1800 RPM.
1—100 HP. G.E. I-K 1800 RPM.

220 or 440V.

1—7 1/2 H.P. G.E. MT 760, 1800 RPM.
1—15 H.P. West. CW 900 RPM.
3-5-7 1/2-10 H.P. Westinghouse SK 850 RPM. 230V. reasonable.
1—20 H.P. G.E. MT 512, 1200 RPM.
1—30 H.P. West. CI 638, 900 RPM.
1—30 H.P. West. CI 960 RPM.
1—30 H.P. West. CW 900 RPM.
1—35 H.P. G.E. ITC 5012 1200 RPM.
1—35 H.P. West. CI 652-D 690 RPM.
1—50 H.P. West. CW 690 RPM.
1—50 KW West. Generator, 125 V., 1150 RPM. compound wound, complete with control panel.

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Heavy duty six feet wide double leaf balanced shaking screen with eccentric drive, shaking picking tables for lump and egg sizes, scraper type hinged loading booms with rescreen area, reciprocating plate feeder and hopper, etc., all supported by steel structure of heavy construction. Designed and built by Link-Belt.

Originally operated as three track plant, but nominal additions will change over to four or five track plant. Capacity 350 tons per hour.

Our engineers have personally inspected this offering and we recommend it to any operator requiring immediate railroad loading facilities for three to five tracks.

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Rochester, N. Y.

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FOR MINING EQUIPMENT

LOCOMOTIVES

- 3—20T Jeffrey and GE 500 V. 42" ga. (Can be re-wound 250V.)
2—8T Goodman Perm. 500 V. 42"/44" ga. gath. (Can be re-wound 250V.)

Rotary Con. & MG Sets (3 ph. 60 cy.)

- 640 KD AL Ch. 250 v.—800 HP Syn. 2300 v. (available 2 months).
150 KW West. 125 v.—225 HP. 2,200 v.
1—150 KW Rldg. 250 v.—225 HP Syn. 2300 v.
100 KW Burke 125 v.—2300/440/220 Syn.
50 KW G.E. 125 v. 75 HP G.E. 2200 v. 440/220 v.
3 New 10 KW 125 v. 220/440/3/60.
7½ KW Wooton 125 v. 10 HP. Wooton Vert.

GOODMAN SHAKER CONVEYORS

- 3—Goodman G 20 Shaker Conveyors with 250 v. 20 HP motors, also Goodman #3 Duck Bills.

MINING MACHINES

- 1—35B Jeff. Perm. 250 v. 7½ Jeffrey Chain & Bar on revolving trucks.
1—35B Jeff. Perm. 250 v. 6" Jeffrey Chain & Bar on revolving trucks.
1—35B Jeff. Perm. 250 v. 6" Jeffrey Chain & Bar on revolving trucks.
412G3 Goodman AC Mchcs. 6½" bar.

STORAGE BATTERY LOCOMOTIVES

- 1—6/7 Ton Jeffrey 44" Ga.
1—6 Ton G.E. permissible 36/44 Ga. HM 825 BB.
4 Ton 36" Ga. Atlas 2 BB Motors.
1—5½ Ton Ironton Type A 36/42" Ga.

Haulage & Gathering Locomotives

- 18 Ton Westgh. 250 v. 36" or 40" Ga.
2—6-ton G.E. 250 v. HM 803 BB Motors, 36" Ga. O.S. Rolled Steel frame with flat top motor driven reel.
10 Ton Goodman 36BO4T O.S. fr. 250 v. 36" Ga.

COAL CRUSHERS

- 18x24 and 18x30 New Scottdale dbl. roll.

DC MAGNETIC STARTERS

- New 230 v. DC Magnetic Cutler Hammer.
Starters, 25, 40, 50, 60, 75 & 100 HP.—150 HP.

SLIP RING & SQ. CG. MOTORS

HP	Make	Speed	Wdg.	Type
1400	West.	1200	Syn.	New 1 P.F.
1000	West.	1200	Syn.	New 2 P.F.
750	West.	1200	Syn.	New B P.F.
435	G. E.	450	Syn.	ATI
300	G. E.	365	S.R.	MT 415-25cy.
300	West.	1800	S.R.	CW
250	West.	277	S.R.	CW 1814
100	G. E.	500	S.R.	M 1-25-cy.
75	West.	690	S.C.	CS
50	West.	560	S.R.	CW 658 D
50	G. E.	900	S.K.	1-M
50	G. E.	720	S.C.	1 K
30	West.	1750	S.C.	CS 405

HOISTS, CRANES & PUMPS

- 400 HP Vulcan conical drum shaft Hoist.
100 HP Vulcan fixed drum 100 HP G.E. S.R. Motor.
1—50/75 HP 2 drum Meade Morrison slope.
75 HP Ottumwa slope with AC Motor.
75 HP Vulcan 2 drum shaft, S.R. Motor.
40 HP Lidgerwood sgl. ft. drum geared to A.C.
25 HP sgl. friction Hoist—230 v. DC Motor.
15 HP Ottumwa sgl. fr. idr.—15 HP. SK 230 v.
10 Ton Larry Car. 500/250 v. DC.
10 HP Fridy Car Fuller, AC Motor.
4—10 Ton Chisholm Moore Chain Hoists.
2—Fairmont Car Retarders.
1—1 Ton AC Monorail 220/2/60.
4—2720 GPM 85' Le Courtney Bronze fitted 10".
1—700 GPM 60' Wheeler Bronze Fitted 5" Cent.
625 GPM 12' Hd. De Laval 10 HP 230 v. DC.
300 GPM 25' Hd. De Laval 1½ HP 230 v. DC.
300 GPM 44' Hd. De Laval 10 HP 230 v. DC.
150 GPM 52' Hd. De Laval 5 HP 230 v. DC.

DC MOTORS, GENERATORS, 230/250 v.

HP	Make	Speed	Wdg.	Type
1200KW	Al. Ch.	750	cpd.	500 v.
1500	West.	600	sh.	600 v.
300 KW	West.	1200	cp.	SK
175	G. E.	475	ser.	MD 109
150 KW	West.	1200	cp.	SK
130	G. E.	550	ser.	CO 1812
125	West.	450/1000	sh.	SK 193
100	G. E.	480	ser.	MD 108
60	West.	1750	sh.	SK 1207
50	Northern	600	ser.	K
50	G. E.	250/1000	sh.	RF14
50	Reliance	1750	cp.	108 T
40	G. E. (Vert.)	1750	cp.	CD 93
40	Roth	1500	sh.	CM
35	C. Wh.	700	sh.	SK 93
30	West.	1750	sh.	S
25	West.	325/975	sh.	SK 63
20	West.	1150	sh.	SK 93
15	Wh.	800	cp.	CM
15 (4)	C. Wh.	1400/1700	sh.	SK 113
13	West. (Enc.)	825	cp.	CD
10 (2)	G. E.	1750	sh.	RL
7½	G. E.	1750	sh.	14T
5	Reliance	1750	sh.	

AIR COMPRESSORS

- 1200 cu. ft. 100# Worthington 2 stage Beltd.
750 CFM 100# Ch. Pa.—150 HP West. S. R.
173 cu. ft. 100# Pres. Chic. Pneu. Beltd.
1—90 cu. ft. 100# Pres. Chic. Pneu. Beltd.
1—75 cu. ft. 100# Chg. Pneu.-AC Motor.

AC MAGNETIC STARTERS (3 ph. 60 cy.)

- 2—700 HP West. 2300 v. Syn. Motor Starters.
1—125 HP. 440 v. Fan. reduced v. Comp.

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3'x6'—2 deck Vibrat. Screen.....780.00
3'x8'—1 deck Vibrat. Screen.....788.00
3'x8'—2 deck Vibrat. Screen.....900.00
3'x8'—3 deck Vibrat. Screen.....1164.00
Stoker Coal Crusher.....474.00
Large Coal Crusher.....1074.00
Coal Crusher with capacities to 215 T.P.H.....3540.00
15 Ton Truck Scale.....578.00
20 Ton Truck Scale.....702.00
5 Ton Tipple Scale.....312.00
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42" N-B-P Car Wheel Borer, M. D.
50" Bullard Vertical Boring Mill.
3" Bar Feedick Horizontal Boring Mill.
18"x10" Boye & Emmes Lathe.
20"x12" Sidney Geared Head Lathe.
20/48"x10" Rahn-Larmon Gap Lathe.
20/40"x14" Schumacher & Boye 2 spdle. Lathe.
2' to 6' Plain Radial Drills.
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18" and 24" G & E Shapers.
26" Smith & Mills Shaper.
30"x30"x10" Cincinnati Planer.
150-ton Hydraulic Wheel Press.

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15 ft. Conveyor Boom
6 ply Tires
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Price: \$1000⁰⁰

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Immediate delivery subject to prior sale.
Special price for more than one.

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MINING MACHINES

Jeffrey: 2—25B, 28A, 250 V. 1—24B Low Vein. 4—29B, 29C, 29CE with shearing head. Also 1 on cats. Revolving head for 29C. 2—Longwall 24B.
Goodman: 12A, 12AB, 12AA, 12G3A, Shortwall, 424, 24B, 124EJ Slabbers.
 1—12G3, 320 volt and 2—17 DA, 2 DA, 500 volt.
 2—Permissible Type 12CA, 6—112AA. Motors for 212 G8—Volts 220. Phase 3.
 1—Hitch Cutter for Cross Head timbers.
 2—Goodman Slabbing Machines, permissible type, 250 and 500 volts.
 3—Longwall Low Vein Type 11AA on self-propelling truck 250 V.
Sullivan: CE7, CE9, CE10, CR10 Low Vein.
 1—Buddy Sullivan 220 Volt, 3 Phase.

SUBSTATIONS — 275 volts, D. C.

1—150 KW. G. E. MG Set.
 1—300 KW Westing. Rotary. As is armature needs rewinding.
 1—150 KW West. MG Set.
 1—100 KW Ridgway MG Set.
 1—200 KW H W Rotary Converter.

LOCOMOTIVES

Goodman: All 250 volts.
 1—6 ton, 30B 43" 1—5 ton.
 1—5 ton 3-20 36" gauge.
 1—6 ton type 8A.
 1—5 ton type 42-0-4-2.
Westinghouse: All 250 volts.
 900 motors and 102-904-115.
 Bar steel frames 10 ton, 6 ton, and 4 ton.
G.E.: All 250 volts.
 6 ton 803, 44" as is.
 6 ton 823, 44".
 6 ton 801.
 8 ton 839.
 1—8 ton type HM 61.
 6 ton 819-821.

LOCOMOTIVES

5 ton 825, 44" and 36".
 8 ton 839.
 2 motors for 8 ton 839.
Jeffrey: 8 ton, 250 volts, type MH73. 1—4 ton MH 12, Locomotive motors and Crabs and Reels for Locomotives.

SPARE ARMATURES

Jeffrey: MH110, MH73, MH73 and MH64-350 V. and 500 V. 29B, 35B and 28, 35BB, 35A, 39C, 29L, 35L.
Goodman: 24B, 30B, 30C, 12A, 2600 K and R; 12AB, 12AA, 32-1-4-T, 31-1-2-T, 32-1-4-T.
General Electric: 801, 807, 819, 821, 825, 839, 61.
Westinghouse: 904, 905, 906, 102, 907, YR2, 115. Also 200 KW.
 200 KW Westinghouse Rotary Converter Armature: 250 V. Bracket Type, 150 KW G.E., HCC Bracket Type.
Sullivan: CE7, CE9 and CE10.

OTHER ITEMS AVAILABLE

Aerial Tramways.
Automat Loader: 1 Myers-Whaley #4.
Belt Conveyors: 1 Bucket Elevator Conveyor.
Bit Sharpeners: 2 Sullivan, 1 Diamond.
Blue Print Machine: 42" wide, continuous Mercury Arc Light.
2 Loading Booms: 40'x5' with Picking Table.
Bond Welders: Resistance.
Circuit Breakers: AC and DC.
Circuit Breakers, Automatic: 250 volt, 600 amps.
Circuit Breakers, Manual: 600 amps to 3,000 amps.
Clam Shell Bucket: 1 1/2 cubic yard.
Coal Crushers: (double roll) 16"x16", (single roll) 24"x30", 24"x24", 36"x36", 30"x30, 18"x18", 12"x16".
Conveyors: Scraper type.

OTHER ITEMS AVAILABLE

Compressors & Jackhammers, Compensators.
Drop Bar Supports: (Gooseneck) 29B and 29C.
 1 Revolving head for 29C.
Dumps: Crossover.
Field Frames.
Generators: DC 250-275 volt, 30 KW to 100 KW. 1—50 KW 3000 R.P.M., 250 Volt.
Hoists:
Hoists, overhead: AC 3-60-400 1 ton and 2 ton. Crabs and Room Hoists.
Lathes: 48"x14" with Taper Attachment and 3-60-220 Motor.
Loading Machines: Myers-Whaley.
Milling Machines, horizontal and vertical.
Mine Cars: 48" gauge.
Mining Machine Trucks.
Motors: Miscellaneous and 1—50 HP Fynn Weichsel, 1800 RPM, 220 Volt Slipring or synchronous Crane type. 1—oilwell motor, 2 speed 575 and 1160-HP. 15' and 36', 440 volts. Slip Ring with control and pole changer and series motors.
Motor Starters and Controllers: AC and DC.
Plants: Diesel Power. Synchronous Motor Starters, full Magnetic Across-the-line, 3 phase, 60 cycle, 4-150 Volts—2-200 H.P. and 6-250 H.P. Westinghouse starters, automatic, magnetic, reversible.
Synchronous motor starters and starters. 1—165 H.P. 440 volt with resistance for slip ring. Motors, 1—100 H.P. 250 volt DC.
Belting 400 ft. 25".
Pulley flat belt-V and conveyors.
Plants natural gas 300 H.P. with DC.
Generators 250 volts and smaller sizes.
Pumps: Rebuilt and New.
R. R. Switches: 85# and 100#.
L. L. Lorry: 2—Myers-Whaley, #3 and #4.

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NOW WE KNOW from the many orders we have received from mining operations of all types that Army Field Telephones are filling the needs for quick, portable communication . . . on the job . . . to save man hours . . . and to promote safety and efficiency in accordance with the latest mining practices.

BATTLEFIELD PROVEN for quick, 2-way communication. Performance equals present-day commercial telephones . . . up to 17 miles!

Just hook up terminals to any two-strand wire; several phones on same line if desired. Operates on standard flashlight batteries with no external power required. Compact . . . rugged . . . portable. Every phone guaranteed. Two phones comprise a set. Order as many as you need—in pairs or singly. Each phone delivered complete with hand generator and self contained ringer.

USED—Good, serviceable condition. Per pair: now \$14.95 (formerly \$19.50)—single phone now . . . \$7.50
NEW—With heavy canvas case. Per pair: now \$25.50 (formerly \$29.50)—single phone now . . . \$12.75
NEW—With leather case. Per pair: now \$28.50 (formerly \$32.50)—single phone now . . . \$14.25
NEW—Canvas or leather case, with case slightly soiled, etc. Performance equals new telephones.
 Per Pair: now \$21.50 (formerly \$24.50)—single phone now . . . \$10.75
RECONDITIONED for Government re-issue—good as new: \$21.50 per pair.

EXTRA WIRE. Genuine 2-strand W-110 Army Field Wire. New, 500 ft. \$3.50. 1/2-mile reel, \$10.50; 1-mile reel, \$16.00. (1/2-mile and one-mile reels sold only with purchase of telephones).

Write for Free Folder on FIELD TELEPHONES. All shipments FOB Sacramento. No COD. Purchase orders accepted from firms with D&B rating.

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MONEY ORDER**

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AIR COMPRESSORS:

12—Belted 360, 676, 870, 1000, 1300 ft.
 12—Diesel 103, 315, 520, 676 & 1000 ft.
 6—Electric 1300, 1500, 2200, 5000 ft.

CARS & LOCOMOTIVES:

100—50 ton cap. Gondolas.
 35—50 ton cap. Flat Cars.
 8—100-ton, 45-ton, 30-ton Diesel Locomotives.
 6—10, 16, 20 & 30 ton Gas Locomotives.
 150—8000 & 10000 gal. cap. Tank Cars.
 26—12 yd. Std. ga. Steel Dump Cars.
 1—50 ton G.E. Diesel Elec. Locomotive.

RUBBER CONVEYOR BELTS:

1000', 60", 600' 30", 300', 20", 1000', 42", 900', 48", 1450', 36", 1200', 24", 900', 18", 600', 18", 350', 14".

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15—3, 5, 8 ton Battery & Trolley.

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12—100, 150, 180 & 480 K.W.

MINE LOADERS:

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6—50,000 and 100,000 gal. Tanks on tower.
 30—8000, 10,000 and 20,000 gallon capacity.

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 16 yd. Elec. 160 ft. Boom Dragline.

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36" GAUGE RAILROAD EQUIPMENT

6—10-Yard Western, All-Steel Manually Operated DUMP CAR With Lift Doors.

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1 1/2 to 10 Ton 13" to 56" Track Gauge
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 Greensburg, Pa.

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ENGINEERED AND REBUILT BY SPECIALISTS IN OUR MODERN PLANT

SQUIRREL CAGE MOTORS 3-PHASE, 60-CYCLE

QU.	HP.	MAKE	TYPE	VOLTS	R.P.M.
1	20	G.E.	I-K	220	865
1	20	Whse.	CS	550	1740
1	25	G.E.	KT3542	220	865
1	25	G.E.	KT332	220	865
1	25	G.E.	I-K	220	1290
1	30	Whse.	CS	550	900
1	35	G.E.	I-K	2200	1200
2	40	AL Ch.	AR	440	860
2	40	F.M.	H12C	440	1200
1	40	Whse.	CS659A	2200	1780
1	50	G.E.	I-K	440	695
1	50	Whse.	CS	220	900
1	50	G.E.	KT536	440	1200
1	50	Ideal	AT445	440	1750
1	75	Whse.	CS	440	1750
3	75	AL Ch.	AR	2200	1765
1	100	G.E.	I-K	2300	695
5	100	F.M.	HS201C	440	880
2	125	C.W.	125Q	440	480
2	125	AL Ch.	AR	440	435
1	125	Whse.	CS761C	440	1800
3	125	AL Ch.	AR	2200	1750
2	135	G.E.	KF542	440	1200
1	150	G.E.	I-K	2200	720
1	200	G.E.	I-K	2300	490
1	250	Whse.	CS	2200	1200
8	20	Rel.	CS504	440	
2	25	Howell	M445	440	

TRANSFORMERS OIL-COOLED

QU.	K.V.A.	MAKE	VOLTAGE	PH. CY.
1	25	AL Ch.	2300/480/230	1 60
3	25	G.E.	2200/1100/608	1 60
3*	37½	Whse.	480/230-230/115	1 60
2	50	Wag.	13200/11830-575/237	1 60

1*	110	EL Fur.	2300-110/94/63/55	1 60
3	130	G.E.	19000/9500-550/2200	1 60
6	165/247	G.E.	38100/22000/11000-430/215	1 60
1	200	Whse.	3810/2200-440	3 60
3	300	Whse.	2400-480/240	1 60

*—Atr-Cooled

MOTOR GENERATOR SETS 3-PHASE, 60-CYCLE

QU.	KW.	MAKE	RPM.	DC. VOLTS	AC. VOLTS
1	5½	G.E.	1800	250	440
1	5	G.E.	1800	250	440
1	15	AL Ch.	1200	250	440
8	25	Whse.	1200	120/240	440
4	25	Whse. (3-U.)	1200	120/240	440/2300
2	35	G.E.	1800	125	440
1	50	Lo. AL	1200	120/240	440
1	75	Whse.	1200	125	440
2	94	G.E.	1200	60	440
1	100	AL Ch.	900	125	2300
1	200	G.E.	1200	250	2300/4000

3-U.—3-Unit Set.

ABOVE FURNISHED COMPLETE WITH D.C. PANELS AND A.C. CONTROL EQUIPMENT.

SYNCHRONOUS MOTORS 3-PHASE, 60-CYCLE

QU.	H.P.	MAKE	P.F.	VOLTS	R.P.M.
1	30	Whse.	.8	220	1800
2	50	G.E.	.8	2200	600
1	60	G.E.	.8	440	1200
1	100	G.E.	.8	2200	900
1	100	Whse.	1.0	2200	1200
1	150	G.E.	.8	440	900
1	150	G.E.	1.0	2200	900
1	500	G.E.	.8	2200	720
1	885	G.E.	.8	6600	514

CAN FURNISH ABOVE WITH EXCITERS, REDUCED VOLTAGE MAGNETIC OR SEMI-MAGNETIC OR FULL VOLTAGE MAGNETIC CONTROLLERS.

SLIP RING MOTORS CONSTANT DUTY 3-PHASE, 60-CYCLE

QU.	H.P.	MAKE	TYPE	VOLTS	R.P.M.
2	5	AL Ch.	ARY	440	720
3	10	G.E.	I-M	220	1120
2	15	G.E.	I-M	220	1300
1	20	G.E.	MT-328	220	900
2	25	G.E.	MT-328	2200	850
4	25	G.E.	MT-528	440	900
2	25	Whse.	CW-481	440	1750
1	30	AL Ch.	ARY	440	900
1	30	Whse.	CW	440	1100
1	40	AL Ch.	ANY	2200	435
3	40	G.E.	MT-346	550	580
1	40	Whse.	CW-644	220	970
1*	40	G.E.	I-M	600	1170
1	50	AL Ch.	ARY	2200	490
2	50	G.E.	MT-536	2200	1200
1	75	G.E.	MT-548	440	1200
1	75	AL Ch.	ARY	440	1750
1	100	G.E.	MT-356	440	900
2	125	G.E.	MT-558	2200	900
1	150	Whse.	CW	2300	1200
1	200	C.W.	127AQ	440	580
1	200	G.E.	I-M	2200	580
1	250	Whse.	CW	2200	580
1	300	G.E.	MT-412	2200	360
1	300	G.E.	IM	2200	1200
1	300	AL Ch.	ARY	2200	514
1	300	G.E.	IM	440	580
1	400	Whse.	CW-1108	2300	500
**	1200	Whse.	CW	2300	590

*—40-cycle.

**—Heavy duty mill type.

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- 1—Jeffrey crab reel, 250 vol.
- 1—100-HP. Buda Diesel engine.
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- 1—14"x8' Sidney lathe, quick change, 5-HP. motor drive.
- 1—10-Ton Morgan-Gardner locomotive, 2" armor plate frame, 42" gage, type HK, 250 volt, ball bearing motors, extra armature, extra truck, new axle gears and pinions, new resistance and other extra parts.
- 1—2A Milwaukee Horizontal milling machine, direct drive with 5-HP. A.C. motor, 6—arborers, 2 draw bars, dividing head and tail stock.
- 4—Falk Herringbone speed reducers, 212.5 to 1 ratio.
- 4—Winifrede worm gear speed reducers, 12½ to 1 ratio.
- 3—25-KVA. G.E. transformers, 2,300 to 110/220 volt.
- 3—100-KVA. G.E. transformers, 7,620/12470Y to 2,300 volt.
- 3—200-KVA. G.E. transformers, 7620/13200Y to 2,300 volt.
- 1—70-KW. West. Motor-Generator welding machine, complete automatic.
- 2—24"x100' Belt conveyor outfits.
- 2—Ton Yale cable king electric hoists, 220 volt, for loading booms or shop use.
- 1—Ton Chisholm & Moore electric hoist, 220 volt.
- 1—300-HP. shaft hoist, 2,300 volt, with magnetic control, cone drum, 1½" rope, for 200' shaft.
- 16—15" Walker-Turner and Delta bench drills, comp. with motors.
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48"	8	1/8"	1/16"	24"	4	1/8"	1/32"
42"	5	1/8"	1/16"	20"	5	1/8"	1/32"
36"	6	1/8"	1/16"	20"	4	1/8"	1/32"
30"	6	1/3"	1/16"	18"	4	1/8"	1/32"
30"	5	1/8"	1/16"	16"	4	1/8"	1/32"
26"	5	1/8"	1/32"	14"	4	1/16"	1/32"
24"	5	1/8"	1/32"	12"	4	1/16"	1/32"

Inquire For Prices — Mention Size and Lengths

TRANSMISSION BELTING

HEAVY-DUTY FRICTION SURFACE

	Width	Ply	Width	Ply	Width	Ply
Inquire For Prices — Mention Size and Lengths.	18"	6	10"	6	6"	5
	16"	6	10"	5	5"	5
	14"	6	8"	6	4"	5
	12"	6	8"	5	4"	4
	12"	5	6"	6	3"	4

ENDLESS "V" BELTS

"A"	Width	All Sizes	—
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APPROVED SPECIFICATION HOSE EACH LENGTH WITH COUPLINGS ATTACHED

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2 1/2"	50 feet	\$28.00
	25 "	16.00
2"	50 "	23.00
	25 "	13.00
1 1/2"	50 "	20.00
	25 "	11.00

Specify Thread On Couplings

AIR HOSE

I.D. Size	Length	per Length	Universal Couplings
1/2"	25 feet	\$5.00	\$1.50 Pair
	50 "	10.00	1.50 Pair
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	50 "	15.00	1.50 Pair
1"	25 "	10.00	1.50 Pair
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3/4"	25 feet	\$4.25		35 feet	\$10.50
	50 "	8.00		40 "	12.00
1"	25 "	6.25		50 "	15.00
	50 "	12.50	1 1/2"	25 "	10.00
1 1/4"	25 "	7.50		35 "	14.00
				50 "	20.00

Each Length with Couplings Attached

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- 1—3-yd. same as above, Marion #332.
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- 1—20-ton cap. Ind. Brownhoist Loco. Steam Crane, dbl. drum, 50' boom.
- 1—20-ton ditto, Link Belt.

MINE AND SLOPE HOISTS

- 1—10,000# cap. Vulcan Sgl. Drum Hoist, 4'x4" drum, 250 HP, AC.
- 1—5,000# cap. Lidgerwood Sgl. Drum Electric Hoist, 600 FPM, GE motor, 250 HP, AC.
- 1—8,000# cap. Ottumwa Hoist, 250 HP, AC. Cross load 17,000#. 850 FPM.
- 1—30,000# cap. dbl. drum Vulcan Hoist, split drums. Capacity, 2,000', 1 1/4" cable. Motor 350 HP, AC.
- 1—8,000# cap. Washington Iron Wks. Sgl. Drum Hoist with 200 HP, 440/3/60 AC, GE motor.
- 2—20,000# cap. Dbl. Drum (parallel) Electric Hoists with 150 HP DC motors, speed 200 FPM, drum cap. 1,000'.
- 1—10,000# cap. Lambert 3 drum (derrick) Electric Hoist with separate motor swinger with control.
- 5—Sullivan 3 drum scraper hoist with 60 HP motor, 220/440/3/60 AC. New condition.
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- 1—200 HP, GE 2300/3/60 AC, 585 RPM Motor with control.
- 1—225 HP, GE Motor for 440/3/60 AC, 585 RPM with control.
- 1—250 HP, Westinghouse Motor, 850 RPM for 440/3/60 AC.
- 1—150 KW Ridgeway 275 volts Generator Set for 2,200/3/60 AC.

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- 1—300 ft. 60" ditto.
- 1—275 ft. 48" ditto.

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- 1—24x36" roll Crusher with 80 HP, AC Motor.

DIESEL MOTORS

- 3—6 cyl. 280 HP, Cummings Diesel Motor.

AERIAL TRAMWAY

- 1—Aerial Cable Tramway, 1,250 ft. long x 1 1/2" rope with haul rope. Motor 60 HP, AC.

COMPRESSORS

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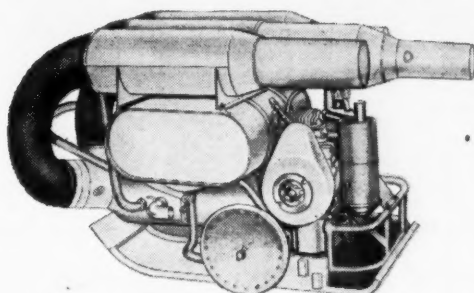
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- 1—G.E. LOCOMOTIVE TYPE LSBE CLASS 206, 85 VOLT, with storage battery, 42" gauge.
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One (1) 29 C Jeffrey Arc Wall Top Cutting Machine, 250 Volt DC, 42" track gauge.

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2—175' CFM Inger-Rand 2 cyl. vert. 150 P.S.I. Type XIV, dir. con. to G.E. 50 HP, DC, motor, 230 V., 400 RPM. Mounted on factory cast iron base. Complete with intercooler, unloader and accessories.

2—1,500 CFM Penna. 110 P.S.I. horiz. 2-stage, Class DCE-2, with direct motor drive, 300 HP, Elec. Mach. syn. motor, 3 ph., 60 cy., 2,300 V., 225 RPM, with intercooler and aftercooler and accessories. Request Bulletin D-100 for other compr. in stock.

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3 Sullivan 7-B Shortwall Mining Machines, 250 volt D. C., 8½ ft. bar, with Joy Caterpillar Trucks. In operating condition. Available now.

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3/60/440 Volts.

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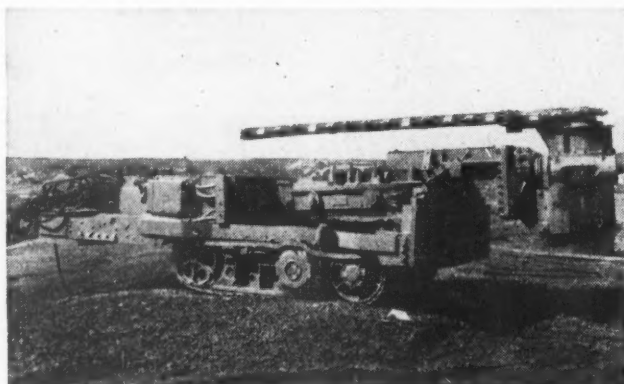
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40 ft. to 600 ft. length.
Also Light Utility Buildings.

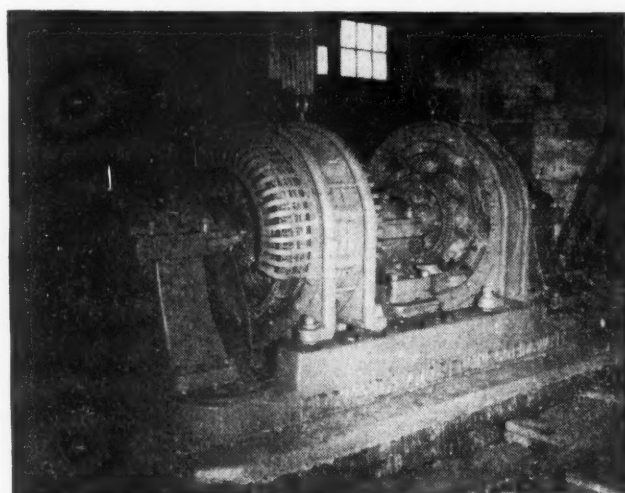
A. JAY HOFMANN COMPANY
Narberth, Pa.

COMPLETE LIQUIDATION IMMEDIATE DELIVERY

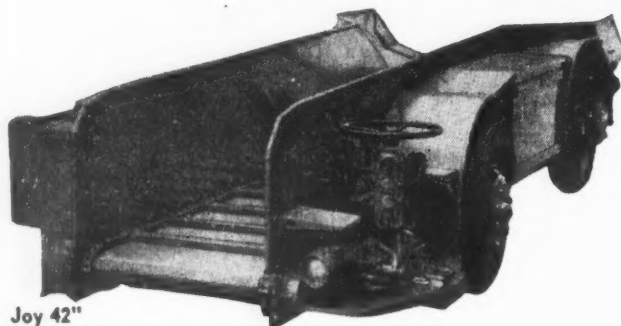
*... Three and one-half million
dollars in new and nearly
new coal mining machinery
and equipment*



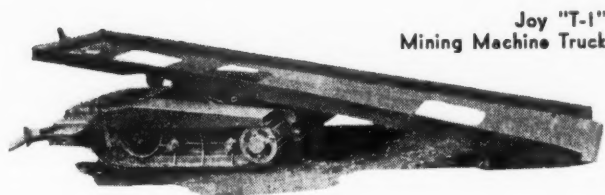
Jeffrey Arcwall 29 L-E Mining Machine



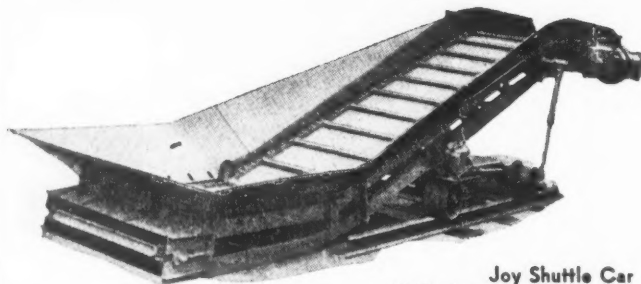
Motor-Generator Sets



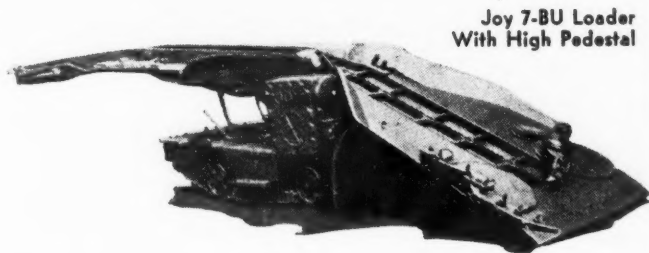
Joy 42"
Shuttle Car



Joy "T-1"
Mining Machine Truck



Joy Shuttle Car
With Elevating Conveyor



Joy 7-BU Loader
With High Pedestal

WRITE FOR OUR COMPLETE LIST
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*Subsidiary of
Portland Equipment Co.*

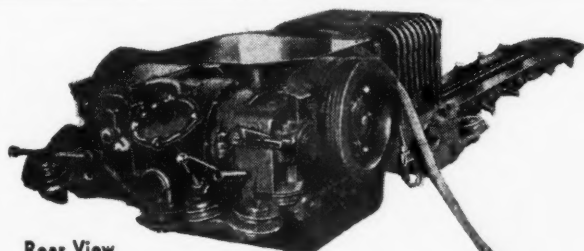
11 Broadway, New York 4, N. Y. 1669 BROADWAY, DENVER 2, COLORADO

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THE COLUMBINE MINE EQUIPMENT CO., INC.

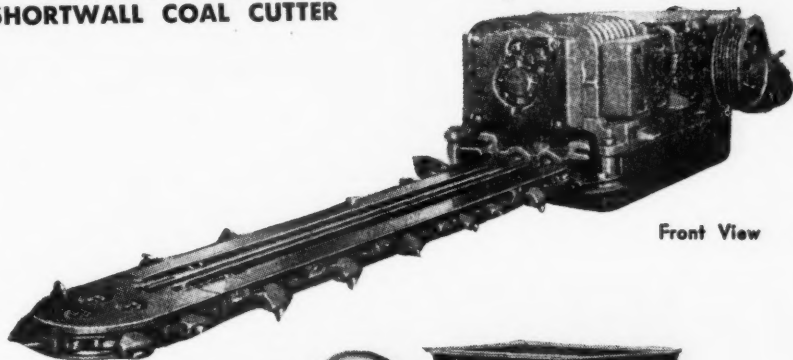
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*... Three and one-half million
dollars in new and nearly
new coal mining machinery
and equipment*

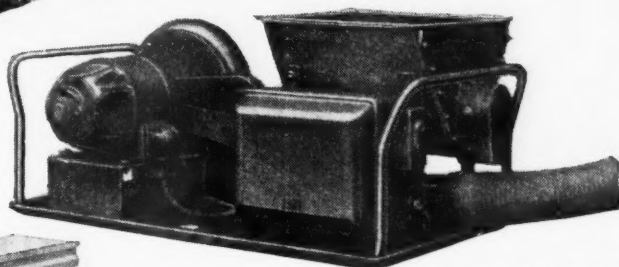


Rear View

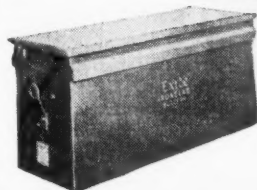
**GOODMAN TYPE 112
SHORTWALL COAL CUTTER**



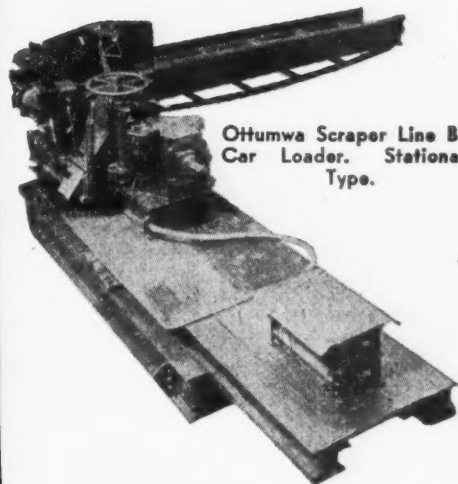
Front View



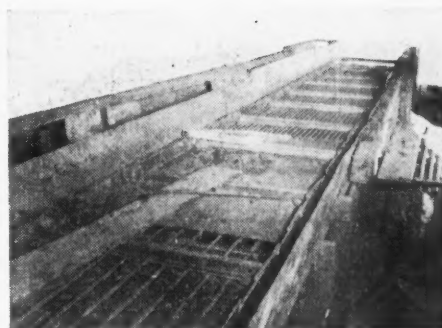
Safety Appliance Co.
Rock Duster



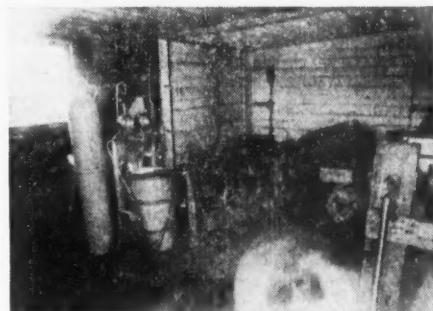
Exide and Gould
Ironclad Batteries



Ottumwa Scraper Line Box
Car Loader. Stationary
Type.



Partial View of Tipple with Grizzlies and
Picking Screen.



Complete Cardox Plant, 160 Shell Capacity

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SEE PAGE 213 FOR APPROXIMATE SUMMARY OF HARD-TO-GET OFFERINGS

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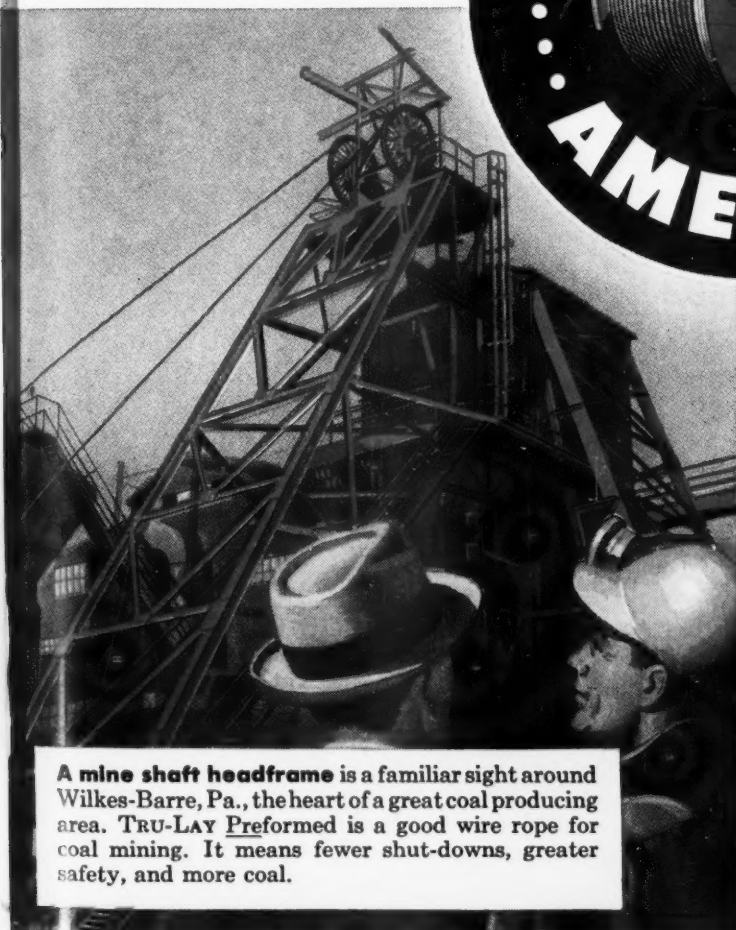
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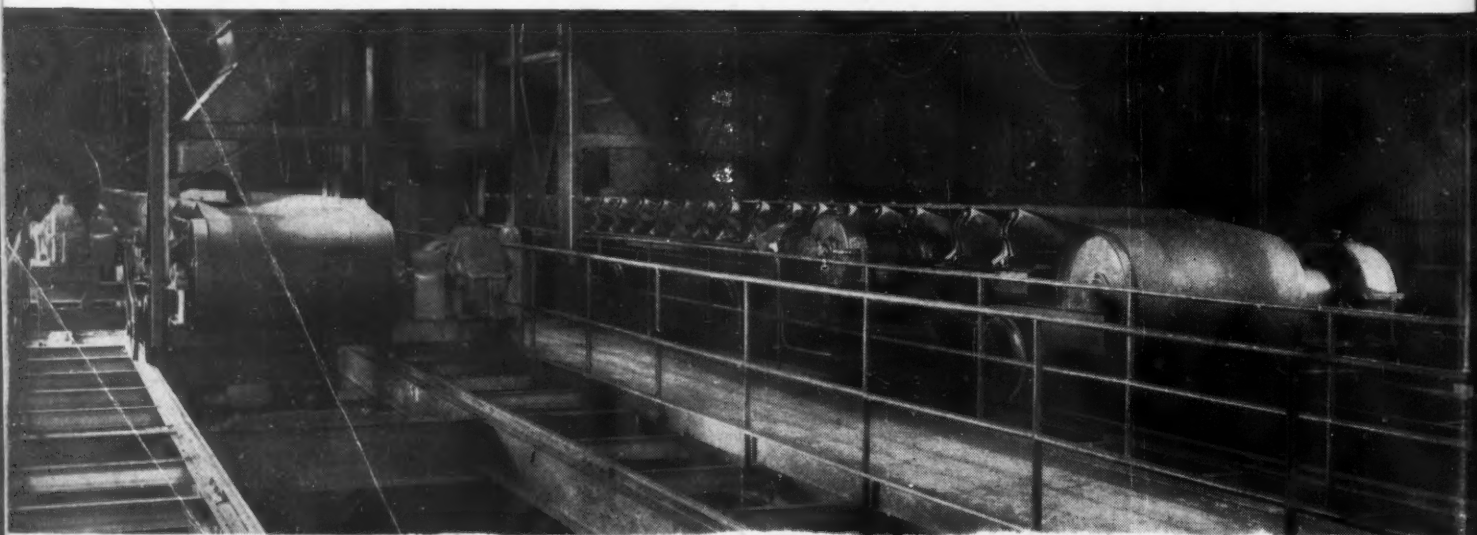
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